ScientificAssistant Manual

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Contents

Chapter 1

Overview

1.1 Introduction

1.1.1 What is ScientificAssistant?

Scientists, writers – anyone doing serious research knows how soon you can find yourself drowning in a sea of journal articles, conference proceedings, papers published and unpublished, newspaper stories, web pages, and books. Keeping track of how it all relates to your own work is the next challenge.

ScientificAssistant is a tool for managing large and complex research projects under Mac OS X. Use its built-in database to manage collections of documents and the relationships among them, and to create bibliographies and cite from them. Use its built-in word processor to write your own documents. Include graphics, movies, figures and equations. Link related ideas. Then use the built-in typesetter to generate your document in either PDF or HTML.

ScientificAssistant has been created from the ground up with scientists in mind. It allows both professional and occasional authors to create, manage, and publish formula-intensive, professional-looking documents, even whole books, quickly and easily, without having to learn an obscure typesetting system.

1.1.2 System requirements

ScientificAssistant is a Cocoa application written in pure Objective-C. It runs on all Macs with MacOSX installed. We recommend at least 128 MByte of RAM, especially if you plan to run databases on the same machine.

ScientificAssistant is built around and requires FrontBase, a relational database management system developed by FrontBase, Inc. and LaTeX, a high-quality typesetting system developed by Leslie Lamport. Both packages are avaiable from www.advanced-science.com and must be installed in order to run ScientificAssistant.

1.2 License

ScientificAssistant is licensed on a per-user basis. If you purchase a license for ScientificAssistant, you will receive a license key encoding your name and your organization. All documents and books created while being logged in as a user that is assigned to your license key will automatically be signed with your name and your organization. The license key is intended for your personal use only. You are not allowed to disclose it to a third party and should not do so in your own interest in order to prevent others from creating and publishing documents under your name.

Trial keys allowing to test ScientificAssistant for a limited period of time are available for free from www.advanced-science.com.

1.2.1 License Agreement

This is a legal agreement between you, the user, and Advanced Science Corporation. By installing the software ("ScientificAssistant") on a computer, independent of how you got access to an installation distribution, you agree to be bound by the terms of this agreement. If you do not agree to these terms, promptly remove all traces of the ScientificAssistant installation distribution from any and all physical media attached to the computer onto which an installation was attempted or completed.

1.2.2 Limited Warranty

The entire liability of Advanced Science Corporation, and your exclusive remedy, shall be a return of the price paid for the software.
Advanced Science Corporation does not warrant that the functions of the software will meet your requirements or that operation of the software will be uninterrupted or error free. You assume responsibility for selecting the software to achieve your intended results, and for the use and results obtained from the software.

Advanced Science Corporation disclaims all other warranties, expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose, for the software and all accompanying written materials. This limited warranty gives you specific legal rights. You may have others, which vary from jurisdiction to jurisdiction.

In no event shall Advanced Science Corporation be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising out of use or inability to use the software, even if advised of the possibility of such damages. Because some jurisdictions do not allow an exclusion or limitation of liability for consequential or incidental damages, the above limitation may not apply to you.

1.2.3 Term

This license is effective until terminated. It will terminate upon the conditions set forth above or if you fail to comply with any term hereof. Upon termination, you agree that the software and accompanying materials, and all copies thereof, will be destroyed. This agreement is governed by the laws of Germany. You acknowledge that you have read this agreement, you understand it, you agree to be bound by its terms, and that this is the complete and exclusive statement of the agreement between you and Advanced Science Corporation regarding the software.

Chapter 2

Getting Started

2.1 Installing ScientificAssistant

All required packages can be downloaded for free from www.advanced-science.com. Please log on to this site navigate to the download page and get the latest versions of FrontBase, teTeX and ScientificAssistant.

2.1.1 FrontBase

FrontBase is a relational database management system developed by FrontBase, Inc. ScientificAssistant uses this database to store documents and books. FrontBase can either be downloaded from www.advanced-science.com or from www.frontbase.com. We recommend to get a license for FrontBase as well (E-Starter is free).

After downloading FrontBase doubleclick on the disk image. A new finder window appears. Doubleclick on the *.pkg file. This starts Installer.app and opens the package. Follow the instructions in the installer application.

2.1.2 teTeX

teTeX is a very common distribution of LaTeX and available for free for almost any platform. You do not need to install this package if you already have a working LaTeX distribution installed on your machine. However, you might have to edit the scripts *compileLaTeXScript* and *convertEPSScript* in the resources folder of ScientificAssisant.app in this case to make sure that the LaTeX binaries are found.

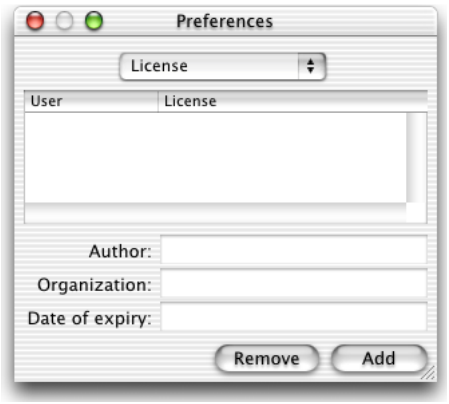
After downloading the package doubleclick on the disk image. Start *TeXGInstaller* and follow the given instructions.

2.1.3 ScientificAssistant

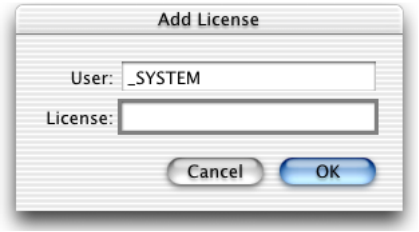
The last package contains ScientificAssistant. Doubleclick on it. StuffIt expander opens and automatically untars the archive. You should now find an application SAInstaller.app on your disk. Start this application and follow the given instructions. If asked for a password enter the password you usually use to log in (not the license key you got from Advanced Science Corporation). You need to have administrator privileges on your machine in order to be able to install ScientificAssistant. SAInstaller.app installs ScientificAssistant.app in /Applications and a few frameworks in /Library/Frameworks. After the completion of the installation process go to /Applications and doubleclick on ScientificAssistant.app to start the application.

2.2 Setting a license key

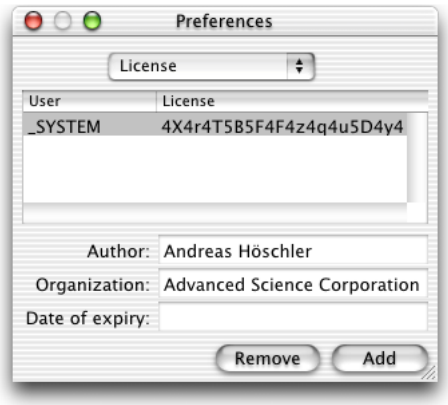
You need to assign a license key to all database accounts you plan to use. If you have not ordered your personal license key for ScientificAssistant yet fill out the trial key form on www.advanced-science.com. Trial keys are available for free. _SYSTEM is the super user in SQL92 and available in all databases by default. In order to assign a license key to this account choose *ScientificAssistant - Preferences...* from the menu and navigate to the license page.



Click on Add. The *Add License* panel appears.



Accept the default value _SYSTEM in the user field or replace it with any other already existing database user. Then enter (copy & paste) your licence key in the license field and click on *OK*. The assignment is added to the list. Note, that your personal license key encodes your name and organization.

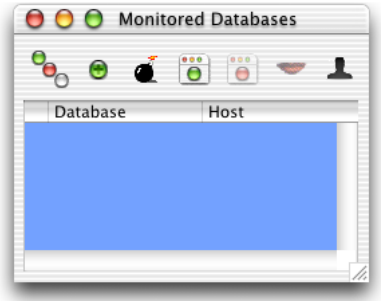


You are now able to connect to databases as _SYSTEM. If you have ordered a license key for FrontBase - you can order a free E-Starter license by clicking on the Buy button on www.frontbase.com - you can set this license using FB-Manager.app located in /Applications. Choose *File - License* from the menu for this purpose. Although FrontBase also works without a license for a limited period of time we recommend to get one anyway. It's free.

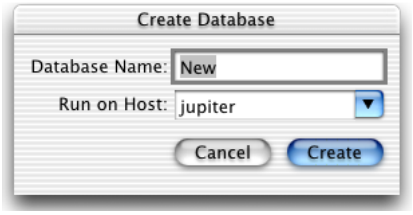
2.3 Quick Start

This section briefly introduces the necessary steps to create and save documents. If you never read manuals but prefer to figure out applications on your own instead read at least this short introduction. We assume that you have already assigned a license to user _SYSTEM. If this is not the case see Section 2.2 for more information about setting license keys.

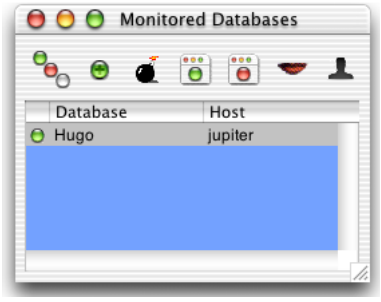
After starting ScientificAssistant the following window appears provided the corresponding switch is checked in preferences. If it does not appear choose *Database - Show List View* from the menu.



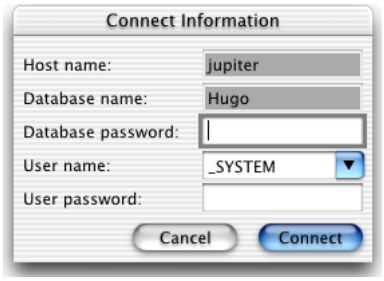
Either click on the small green ball with the plus sign in the list view window or choose *Database* - *New...* from the menu in order to create a new database. The *Create Database* panel shows up.



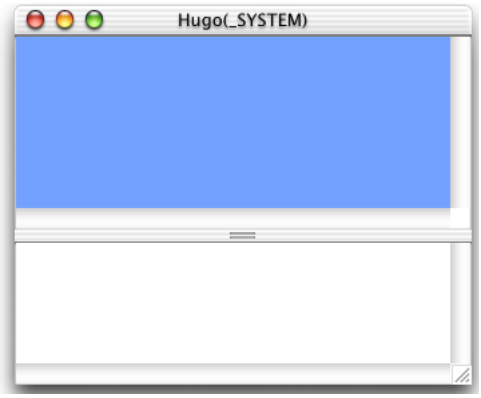
Enter any database name (e.g. Hugo) consisting of letters and numbers (spaces are not allowed) and click on *Create*. If a database with this name already exists on the specified host it is simply added to the set of monitored databases. Otherwise it is created. The list view monitor window might look as follows now.



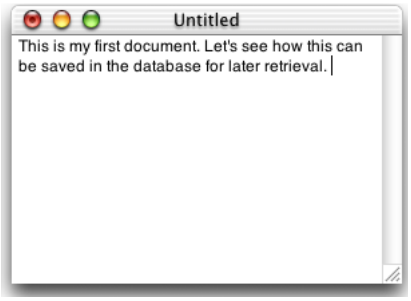
Doubleclick on the row representing the newly created database in order to establish a database connection. The *Connect Information* panel shows up.



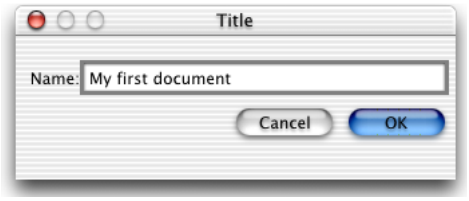
Accept the default values in the fields and click on *Connect*. ScientificAssistant connects to the database and creates all required tables. After a second or so the following session window appears.



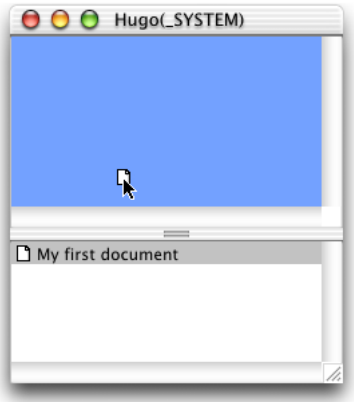
Choose *File* - *Document* - *New* from the menu. An empty document window appears. Enter some text.



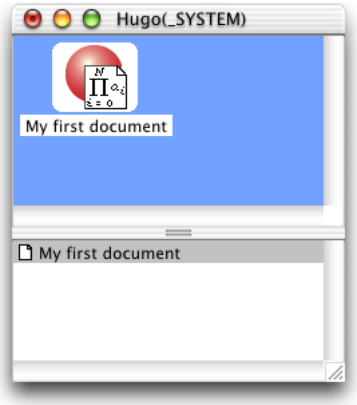
Choose *Database* - *Save* from the menu to save the document in the database. Since no title has been specified yet you are asked for one. Enter any title and click on *OK*.



Your document is saved in the database and appears in the tableview on the session window. You might want to drag your document to the bookmark view.



A doubleclick on the row in the tableview or the icon in the bookmark view opens the document.

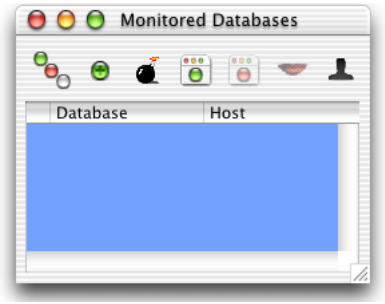


ScientificAssistant allows to combine documents to books. See Section 2.6 for more information about creating and editing book objects. Moreover ScientificAssistant allows to manage arbitrary files (tex, html,...) in so called folders. This is discussed in Section 2.7.

2.4 Databases

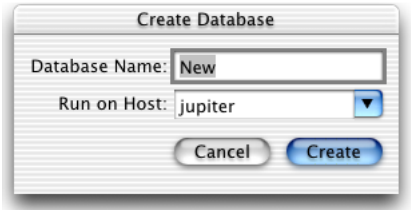
2.4.1 Creating Databases

After starting ScientificAssistant the following window appears if the corresponding switch is checked in preferences. If it does not appear choose *Database - Show List View* from the menu.

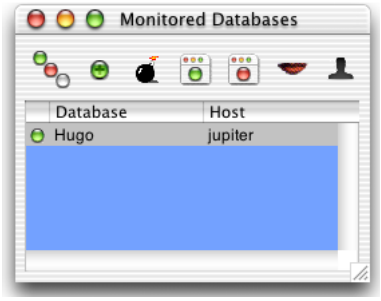


This window lets you monitor a set of databases. Each database is represented by a row in the tableview. ScientificAssistant offers an additional monitor view with equivalent functionality. Choose *Database - Show Icon View* from the menu to open an icon based monitor window presenting the same set of databases.

Which windows are displayed when starting the application can be specified in the applications preferences. If you have started ScientificAssistant for the first time both windows will be empty. Either click on the small green ball with the plus sign in the list view window or choose *Database - New...* from the menu in order to create a new database. The *Create Database* panel shows up.



Enter any database name (e.g. Hugo) consisting of letters and numbers (spaces are not allowed) and click on *Create*. If a database with this name already exists on the specified host it is simply added to the set of monitored databases. Otherwise it is created. The list view monitor window might look as follows now.



2.4.2 Deleting Databases

Select the database(s) you want to delete and click on the *Delete Database* button on the list view monitor window. You are asked whether you really want to delete databases. Please note, that deleting databases can't be undone. So better check twice if you really want to delete all selected databases before going ahead. You will now be prompted to enter the super user password for each of the selected databases. If no password has been set for _SYSTEM leave the password field empty and simply click on *Connect*.

2.4.3 Stopping Databases

The small green ball in the left most column indicates that the corrsponding database is up and running. You can stop a selected database by clicking on the *Stop Database* button of the list view monitor window. The green ball will become transparent indicating that the database has stopped. Simply doubleclick on a row in the tableview to restart the corresponding database.

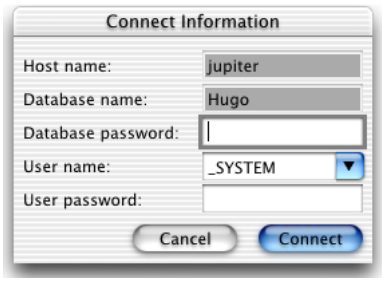
2.4.4 Monitoring Databases

The list view monitor window and the icon view monitor window allow to monitor multiple databases simultaneously. To add already existing databases to the set of monitored databases click on the *Monitor Database* button. In the upcoming panel select a host in the left column of the browser. All not yet monitored databases on this host will be shown in the right column. Select one or more databases and click on *Select*.

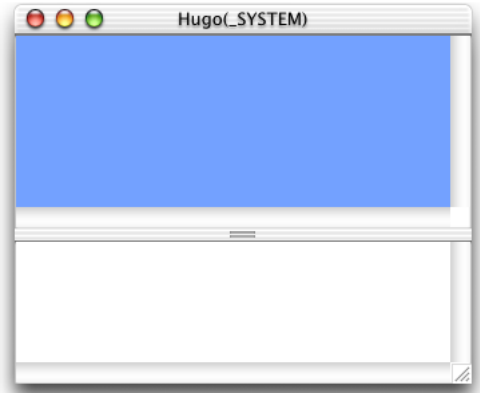
If the desired hostname is not listed in the left browser column enter it in the hostname field below the browser and press *Enter*. If that host is found it is added to the list of hosts in the left column. You can alternatively enter a numeric ip-address in the hostname field. Note, that the *Select databases* panel only allows you to select already existing databases. If you want to create a new database refer to Section 2.4.1.

2.4.5 Connecting to Databases

You need to establish a connection to a database before you can create or access existing documents. You do so by doubleclicking on a row on the list view monitor window or by doubleclicking on an icon representing a database on the icon view monitor window. The *Connect Information* panel shows up.



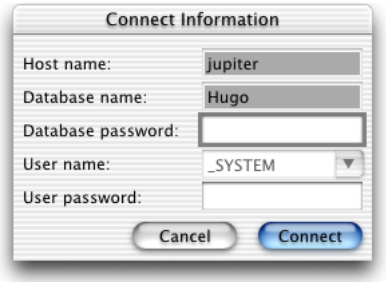
If you have not yet created any other user accounts in the database accept the default _SYSTEM for the username. Leave all other fields blank unless you already have set a password for _SYSTEM or a database password and click on *Connect*. All tables required by ScientificAssistant are created automatically when you connect to a newly created database for the first time. After making sure that all required tables exist the following session window appears.



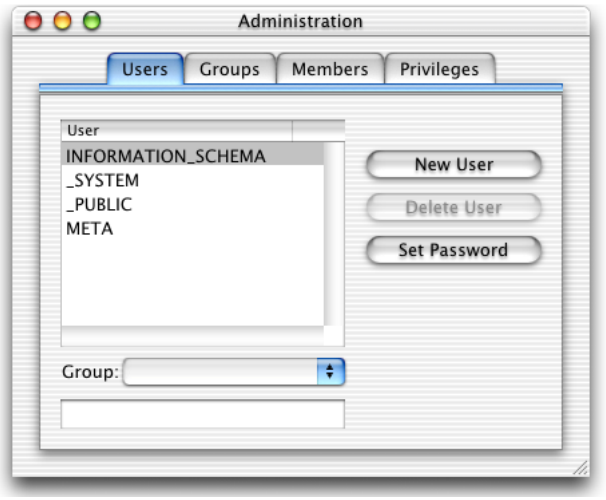
The title of this window indicates to which database (*Hugo*) and under which name (*_SYSTEM*) a connection has been established. A session window contains two views separated by a movable slider. The tableview below the slider is where fetched documents and books are listed. The icon view above the slider can be used to bookmark frequently used database items. Simply drag a document or a book from the tableview to this icon view to create such a bookmark. A corresponding icon for the dropped item appears and allows fast access to a document or book without having to specify a corresponding fetch specification each time you log in. A doubleclick on such an icon opens the database item.

2.4.6 Administering Databases

In this section you will learn how to create user accounts, set passwords and perform other maintenance tasks like creating and assigning groups or setting default privileges for database items. Create an administration connection to the database you want to administer by clicking on the *Administer Database* button on the list view monitor window. The following connect panel appears.



Note, that you have to connect as _SYSTEM for performing administration tasks. Enter a password if one has been set for _SYSTEM and click on Connect. The following administration window appears.



2.4.6.1 Creating user accounts

The *Users* page lets you manage user accounts. Note, that a bunch of users exist by default. These user accounts are necessary for the database to work correctly and cannot be removed. However, you can set passwords for all of them.

In order to create a new user account enter the username in the textfield below the tableview and click on *New User*. A corresponding entry is added in the tableview. Delete a user by selecting it in the tableview and clicking on *Delete User*.

2.4.6.2 Setting passwords

Select the user you want to set a password for in the tableview on the users page of the administration window and click on *Set Password*. A panel appears requesting you to enter the password twice. Click on *Set*.

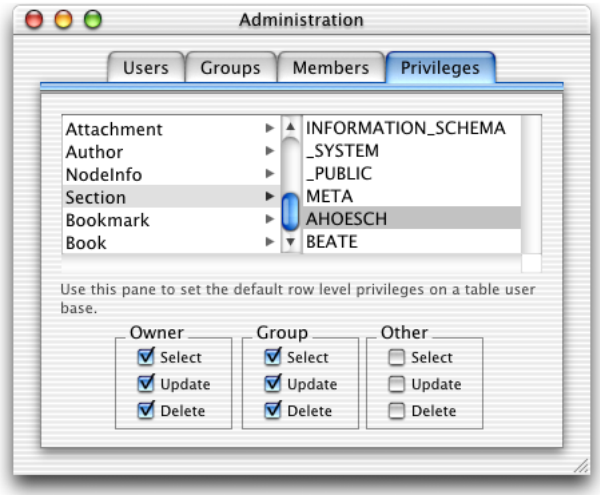
2.4.6.3 Creating groups

The *Groups* page of the administration window allows you to create and delete groups. Users can be added to and removed from groups on the *Members* page. This gets important as soon as you grant access privileges for your documents and books to a specific group.

2.4.6.4 Setting default privileges

Each database item (document, book,...) in ScientificAssistant is owned by a specific database user. This typically is the user that created the item. The owner of such an item can grant access privileges to himself, to other users in

his group and to others in general. If a user decides that he does not want other users with accounts for the same database being able to update or even see its documents and books he can simply set the access privileges accordingly. This is done in the document inspector discussed in Section 2.5.2.3. However, the *Privileges* page of the administration window allows to set default privileges for newly created database items.

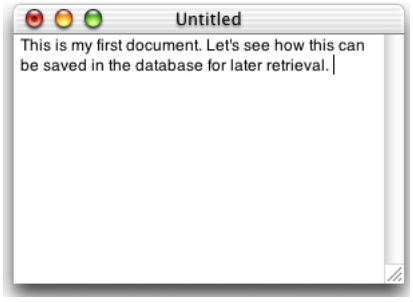


If you want that documents (sections) created by user *AHOESCH* are invisible to all aother users, select *Section* in the left browser column, *AHOESCH* in the right browser column and deselect all check boxes in *Group* and *Other*.

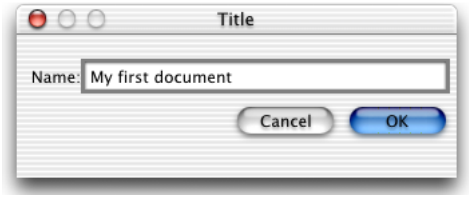
2.5 Documents

2.5.1 Creating Documents

Since ScientificAssistant uses a relational database to store documents we have to establish a database connection first. See Section 2.4.5 for more information about creating and connecting to databases. After establishing a database connection choose *File* - *Document* - *New* from the menu. An empty document window appears. Enter some text.



Choose *Database* - *Save* from the menu to save the document in the database. Since no title has been specified yet you are asked for one. Enter any title and click on *OK*.



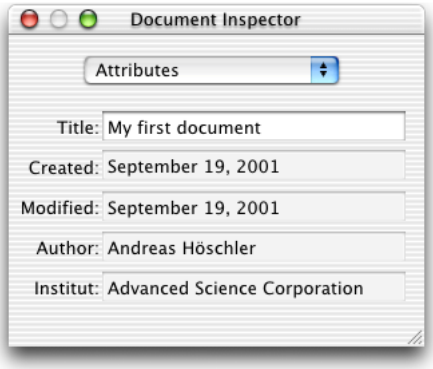
Your document is saved in the database.

2.5.2 Inspecting Documents

In this section you will learn how to edit titles, assign categories and set access privileges for documents. Make sure any document is open and active. Then choose *Tools* - *Inspector* from the menu to raise the document inspector.

2.5.2.1 Attributes

In order to edit the title of a document go to the attributes page of the document inspector and edit the value in the title field. All other fields on this page are read-only.

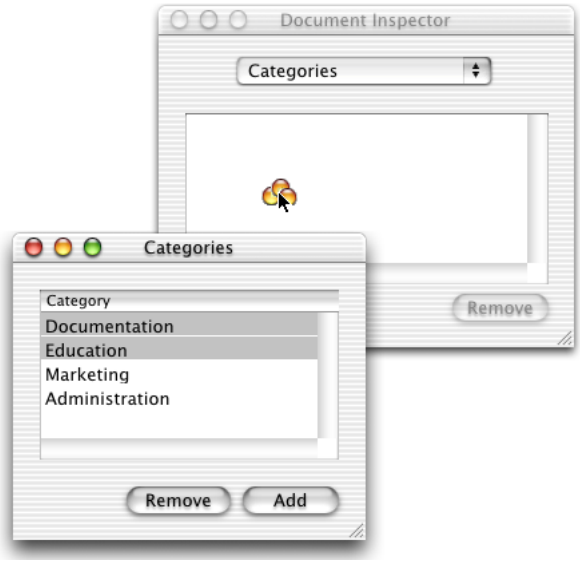


The meaning of the attributes *Created* and *Modified* is self-evident. These attributes are set automatically when a document is created or updated. The two remaining fields indicate who created the document. The values for *Author* and *Institut* are derived from the licence key assigned to the database user that created the document.

2.5.2.2 Categories

The *Categories* page of the document inspector allows you to assign user definable categories to the inspected document. These categories can be used to build fetch specification for efficient document retrieval. Choose *Tools - Categories* to open the category manager for the currently activate database. Eventually add a few categories.

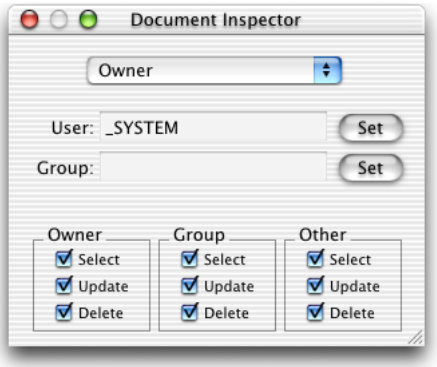
Drag one or more categories from the category manager to the tableview on the *Categories* page of the document inspector.



Selected categories can be removed by clicking on the *Remove* button.

2.5.2.3 Owner

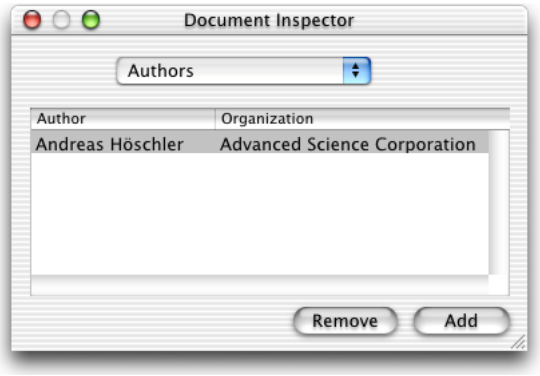
The owner page of the document inspector allows to view and set the owner and group of a document. Moreover, the owner can specify access privileges for himself, his group and all other users.



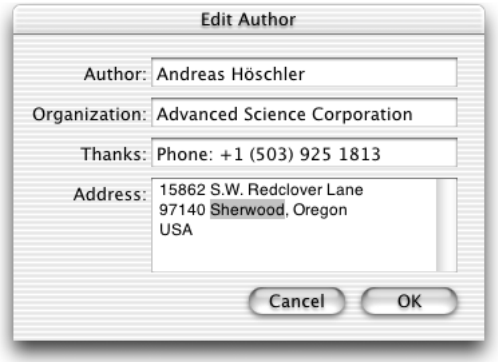
If a database user wants to give other users read but no write privileges for a specific document all he has to do is deselect the corresponding *Update* and *Delete* switches on the *Owner* page of the document inspector. It might even be reasonable for a user to remove the *Update* and *Delete* privileges for himself in order to prevent accidental deletion or modification of an important document.

2.5.2.4 Authors

The *Authors* page of the document inspector lets you view and edit a list of authors that are to be put on the title page when generating LaTeX code. The initial author and all other users that have modified the document are automatically listed. However, you can manually add any number of additional authors if you like.



Click on the *Add* button to add a user. Doubleclick on a row in the tableview to edit an entry.



This leads to the following title page when generating LaTeX for the document.

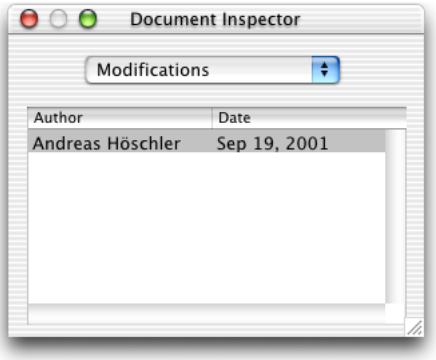
My first document

Andreas Höschler[1]
15862 S.W. Redclover Lane
97140 Sherwood, Oregon
USA

Wed Sep 19 2001

2.5.2.5 Modifications

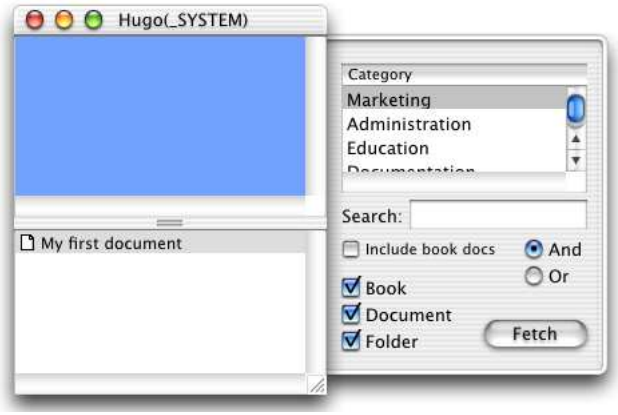
The *Modifications* page lists all ScientificAssistant users that have actually accessed and modified the document sorted by date.



In this case only one author is listed since this document got only modified by its creator. The last modification took place on Sep 19, 2001.

2.5.3 Retrieving Documents

You retrieve documents by specifying a fetch specification and triggering a corresponding fetch operation. This includes a round trip to the database. After establishing a connection to a database as described in Section 2.4.5, choose *File - Fetch...* from the menu. The fetch drawer rolls out on the right side of the session window.

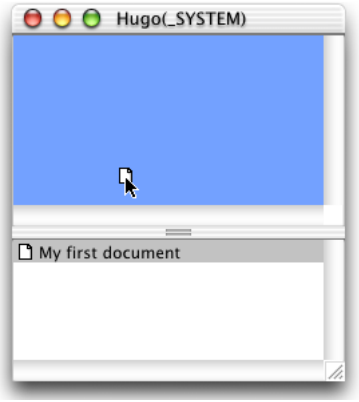


All defined categories are listed in the tableview. You can define categories by choosing *Tools - Categories* from menu and adding corresponding entries. On the fetch drawer select none, one or more categories you are interested in and click on *Fetch*. This creates a corresponding SQL statement and sends it to the database. All documents, books and folders returned by the database are listed

in tableview of the session window. If you want to fetch items regardless of their assigned categories deselect all categories in the category table view. Command click on selected categories to do so.

You can also perform a full text search. If you want to search through all documents in the database make sure no category is selected. Then enter any string in the search field and hit *Return*. All documents containing the given string will be listed almost immediately. You can also enter expressions like "Compton AND Meyer" in the search field. This retrieves all documents that contain the word *Compton* and the word *Meyer* in either the text or the title. Full text search is case-insensitive.

A doubleclick on a row in the tableview opens the corresponding item. If you no longer need the fetch drawer roll it back by choosing *File - Fetch...* again. You can now drag one or more of the fetched items to the bookmark view in order to create corresponding bookmarks.



A doubleclick on a row in the tableview or an icon in the bookmark view opens the corresponding document, book or folder.

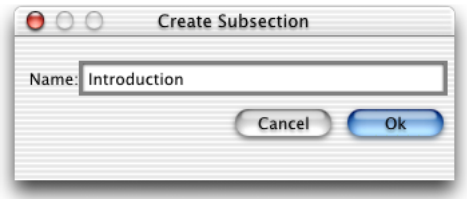
Bookmarks can be removed from the bookmark view by clicking on them and choosing *Edit - Delete*. Note, this only removes the item from your bookmark list. For deleting documents see Section 2.5.4.

2.5.4 Deleting Documents

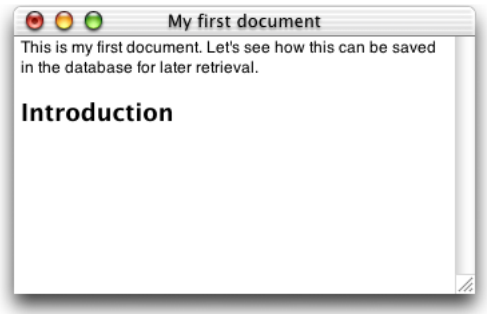
Select one or more items in the tableview on the session window and choose *Edit - Delete*. This removes the selected documents and books from the database. Hit save to commit the transaction. If you have accidentally deleted a document choose *Database - Revert* from the menu (before you hit save) to refetch items from the database.

2.5.5 Sections

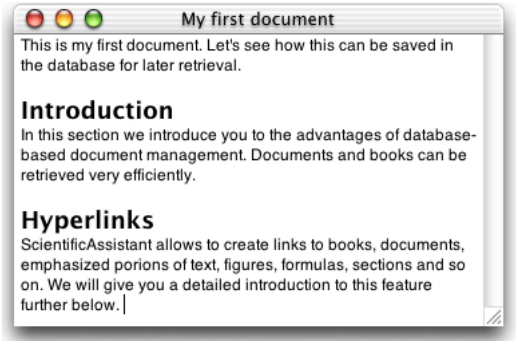
A section consists of text and an arbitrary number of subsections. Each subsection can again have subsections and so forth. A document is a section with some additional attributes like an abstract and a set of assigned categories. In any open document place the cursor somewhere at the beginning of a new line and choose *Section - Create* from the menu in order to create a new section. The following panel appears.



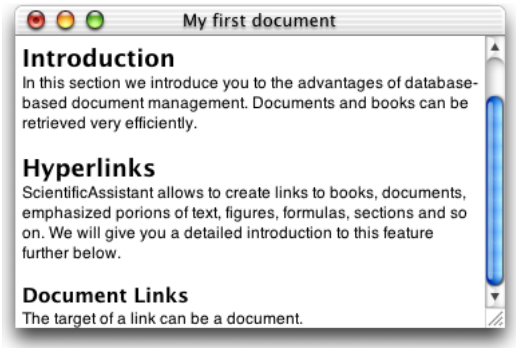
Enter any title and click on *OK*. A section headline with the specified title is inserted at the current cursor position.



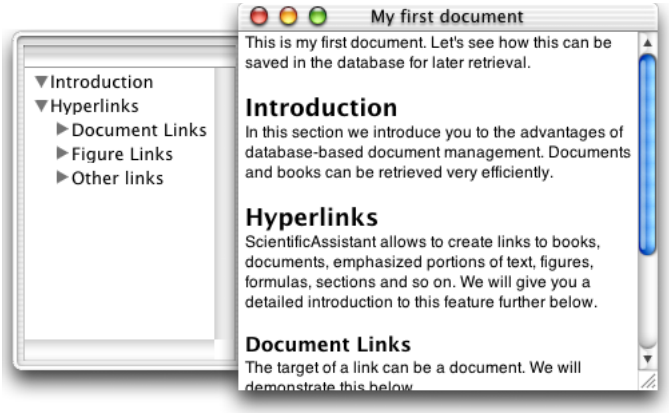
Enter some text below the section title. Then choose *Section - Create* again to create a further section. Your document might look as follows now.



By default a newly created section is assigned the same level as its predecessor, it becomes a sibling. However, you can lower or raise a section in the hierachy by choosing *Section - Up* or *Section - Down* from the menu. Create a further section below the Hyperlinks paragraph. Then make sure the cursor is on the new section title and choose *File - Section - Down* from the menu to lower this section in the hierachy. It will become a subsection of "Hyperlinks".



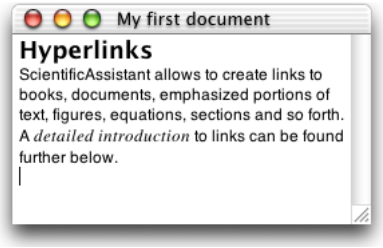
Note, that *Document Links* is assigned a smaller font in order to indicate that it is a subsection of *Hyperlinks*. You might want to create further subsections in *Hyperlinks* or in *Document Links*. These subsections can again have subsections and so forth. Create one or two more subsections in *Hyperlinks*. Then choose *Document - Navigator* from the menu. A navigation drawer rolls out on the left side of the document window.



If the navigation drawer does not show the subsections of *Hyperlinks* either click on the little arrow next to it in order to expand this item or choose *File - Document - Expand* from the menu in order to expand all sections at once. Doubleclick on a section in the navigation drawer in order to quickly navigate to its counterpart in the document. The navigation drawer allows to navigate efficiently even in very long documents with a complex hierachy. Choose *Document - Navigator* again if you no longer need the navigation drawer.

2.5.6 Adding Emphasis

In ScientificAssistant you do not assign a specific font to a portion of text or manually underline a word. How should this be mapped to HTML or LaTeX? You assign an emphasis attribute instead. What font or tag is actually used on screen or while generating HTML and LaTeX is specified in the preferences. Select a word or a phrase in any open document and choose *File - Emphasis* from the menu. If you had *detailed instructions* selected before choosing *File - Emphasis* your document might look like the one below now.



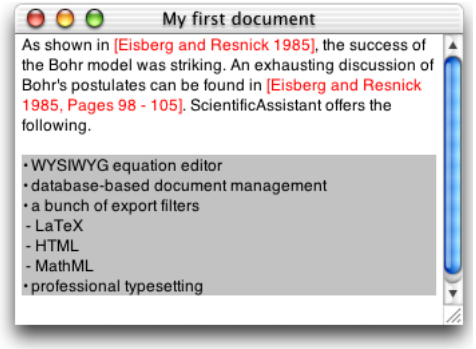
Emphasis attributes are removed by placing the cursor anywhere within the emphasized portion of text and choosing *File - Remove Property* from the menu.

2.5.7 Lists

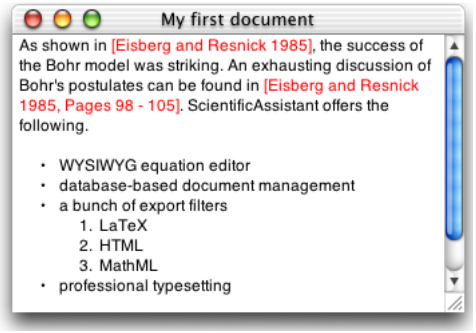
ScientificAssistant offers a list environment feature for creating bullet and numbered lists. Lists can be arbitrarily nested. Creating a list is a two step process. You first enter source text for the list and then apply the list attribute. The format of the source text is discussed in the next paragraph. You set the list attribute by selecting the source text and choosing *File - List* from the menu. This formats the source text accordingly and automaticaly numbers the list items.

The line for a first level item must start with either a bullet or a minus sign followed by a space followed by the item text. Use bullets if you want to create a bullet list. Use minus signs if you want to create a numbered list. The minus signs are automatically replaced with numbers when applying the list attribute so do not enter numbers yourself. Do not insert spaces or tabs in front of the bullets or minus signs unless you want to create a sublist. A preceeding space indicates a deeper level.

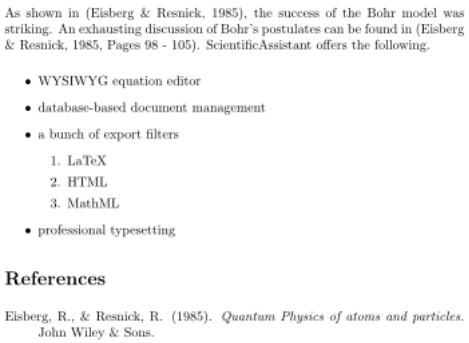
Open any document and enter the selected text in the document shown below. Insert no spaces in front of the bullets (first level items) and exactly one space in front of the minus signs (second level items). Then select the source text for the list creation



and choose *File - List* from the menu. The selected text is assigned the list environment attribute and formatted accordingly.



Note, that the minus signs are automatically replaced with corresponding numbers. You cannot edit text within list environments. If you would like to perform changes to a list environment you have to remove the list environment attribute first. You do this by clicking in the environment and choosing *File - Remove Property* from the menu. After performing the modifications, select the text and choose *File - List* again. List environments look as follows in PDF.



As shown in (Eisberg & Resnick, 1985), the success of the Bohr model was striking. An exhausting discussion of Bohr's postulates can be found in (Eisberg & Resnick, 1985, Pages 98 - 105). ScientificAssistant offers the following.

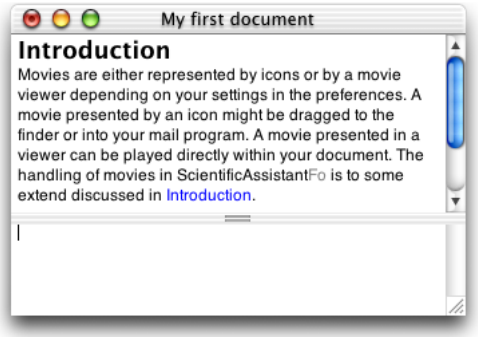
- WYSIWYG equation editor
- database-based document management
- a bunch of export filters
  1. LaTeX
  2. HTML
  3. MathML
- professional typesetting

References

Eisberg, R., & Resnick, R. (1985). *Quantum Physics of atoms and particles.* John Wiley & Sons.

2.5.8 Footnotes

Authors of scientific documents are used to put exhausting explanations of terms in footnotes. This can easily be accomplished with ScientificAssistant. Place the cursor in your document where you want the footnote marker to appear. Then choose *File - Create Footnote* from the menu. The textview in the document window is replaced with a splitview containing two subviews separated by a horizontal slider. The document text is put into the upper subview. A footnote textview is put into the lower subview.



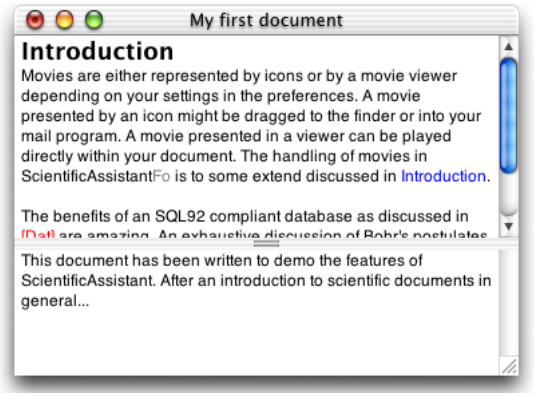
Enter the footnote text into the textview below the slider. The footnote text can contain emphases, equations,... When done choose *File - Hide Footnote View* from the menu to hide the footnote view and in order to continue your work in the document. LaTeX uses arabic number as footnote markers and places footnotes at the bottom of the page below a thin horizontal line.

A movie presented in a viewer can be played directly within your document. The handling of movies in ScientificAssistant[1] is to some extend discussed in Section 1.

[1]ScientificAssistant is a database base document management and scientific wordprocessing system developed by Advanced Science Corporation.

2.5.9 Abstract

Scientific documents are usually preceeded by an abstract. An abstract is a summary of the documents contents. Open any document and choose *File - Document - Abstract* from the menu. The document window is devided into two parts separated by a horizontal slider. The view above the slider contains the documents. The view below the slider can be used to enter or edit an abstract.



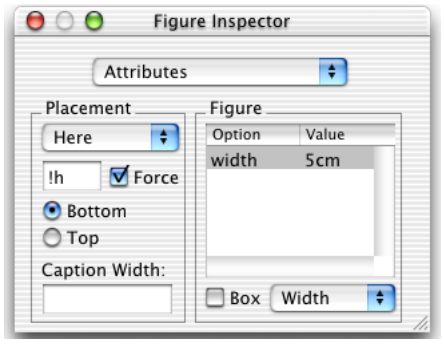
LaTeX generates an extra page if an abstract has been entered. The abstract page might look as follows.

Abstract

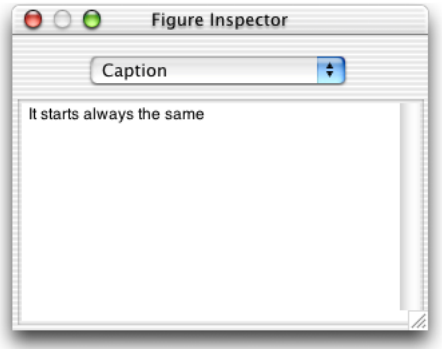
This document has been written to demo the features of ScientificAssistant. After an introduction to scientific documents in general...

2.5.10 Figures

ScienticAssistant supports all major graphic formats including PDF, EPS, TIFF, JPEG, GIF, PNG. Place the cursor where you want the figure to be inserted, then simply drag it from the finder to your document. The figure will automatically be centered. You can specify a caption and some other attributes in the figure inspector. Choose *Tools - Inspector* from the menu to raise the inspector. Then click on the figure to be inspected if it isn't already selected.



These attributes have effect while generating LaTeX only. The placement options are only recommendations for the LaTeX engine. Even if you choose *Here* for the placement and check *Force*, LaTeX might still place your figure elsewhere in order to avoid empty pages and suboptimal page breaks. However, LaTeX can be forced to place the figure where it appears in the ScientificAssistant document with the placement option H (uppercase letter). This placement option is set by default when you drag an image onto your document. You might want to experiment with these options if you are not satisfied with the resulting PDF. The figure options let you specify the size of the figure in the printout. By default the figure option scale=0.5 is set. You can remove a selected figure option with *Command-D*. You add figure options by making a selection in the popup below the figure options tableview and entering a corresponding value in the value column.



The *Caption* page of the figure inspector allows to specify a caption text. This text can contain emphasized portions of text, formulas, ... but no sections. A figure with the above settings might look as follows in printout.

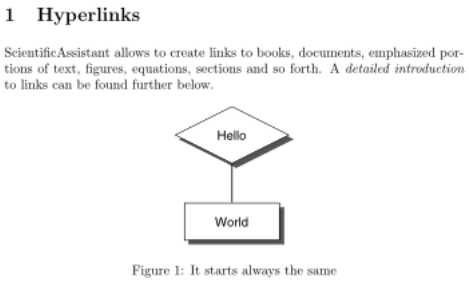


Figure 1: It starts always the same

EPS figures will automatically be converted to PDF when dragged onto the document. All other formats will be stored as is and converted to PDF on the fly while generating LaTeX or to PNG/JPEG/GIF depending on your settings in preferences when generating HTML.

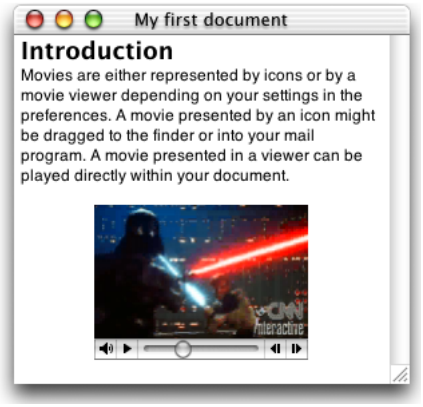
ScientificAssistant does not include drawing functionality for the creation of figures but offers resource file storage capabilities instead. This allows to create and edit figures with third party applications while storing the resulting figure together with the resource file in the database. You for example might have created a drawing with Create.app or OmniGraffle.app. Export the drawing to EPS or PDF and drag the image file onto your document. This creates a ScientificAssistant figure. Then doubleclick on the figure in your SA document. This opens an empty folder (see Section 2.7) attached to the figure. Now drag the *.create or *.grafflle file onto the folder and save your document. The resource file together with the document is stored in the database. If you later want to edit your drawing simply doubleclick on the figure in your document to open the folder containing the resource file(s). These files are written to a temporary directory while the folder is opened. Then doubleclick on the *.create or *.graffle file in the folder to automatically open it in the corresponding application and edit your drawing. ScientificAssistant automatically realizes modifications in the temporary folder directory. Hit save to store your changes in the database. Then reexport to EPS or PDF in the third party application, select the figure in the ScientificAssistant document and drag the updated EPS or PDF file on the figure.

2.5.11 Attachments

Unless a dropped file is recognized as a figure (EPS, PDF, TIFF,...) it will be stored as a generic text attachment. You can for example drag a tar archive, an rtf document or any other file from the finder to your document. Those attachments are represented by a corresponding icon in the ScientificAssistant document and the files they are representing are actually stored in the database (not only a link to the file on disk). You can drag such an attachment back to the finder any time or open it with an associated application by simply doubleclicking on it.

Movies might be handled differently. If you chose *Movie Viewer* on the *Miscellaneous* page of the preferences panel movies are not represented by an icon but

by a movie player that allows to play movies directly from within the document.

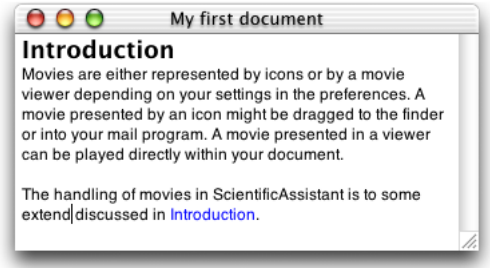


2.5.12 Links

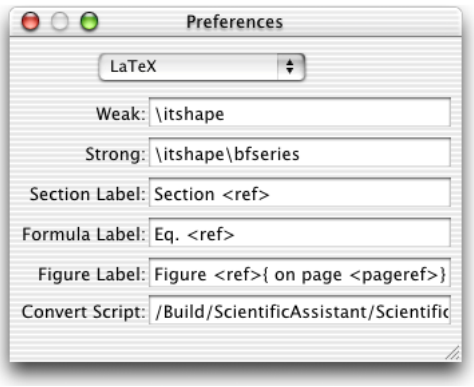
Links allow to quickly reach any linkable object in the database. This can be a document, a section within a document, a book, an equation, a figure, an empasized portion of text or an entry in the bibliography database. Creating links is a two step process. You first mark the source by placing the cursor anywhere in the source document and choosing *File - Mark Source* in the menu. The word MARK appears at the current cursor position. This word is internally marked as the source for a pending link creation. Now select the destination for the link, e.g. an emphasized portion of text in any document, a figure or an entry in the bibliography database - it is sufficient to singleclick on the target - and choose *File - Create Link* from the menu. The marked source text is replaced with an automatically generated string that depends on the links target.

2.5.12.1 Section references

Section references are represented by a string that is derived from the section title of the targeted section put in bright blue. A singleclick on such a links opens the destination document if necessary and places the cursor next to the target.



These links will be accordingly converted when generating HTML. However, when generating LaTeX for the document ScientificAssistant makes use of the setting on the *LaTeX* page of the preferences panel to determine the representation.



By default section references are represented by the keyword Section followed by a section reference that is determined by LaTeX itself and corresponds to the number of the targeted section. Generating LaTeX for the above example might produce the following result.

1 Introduction

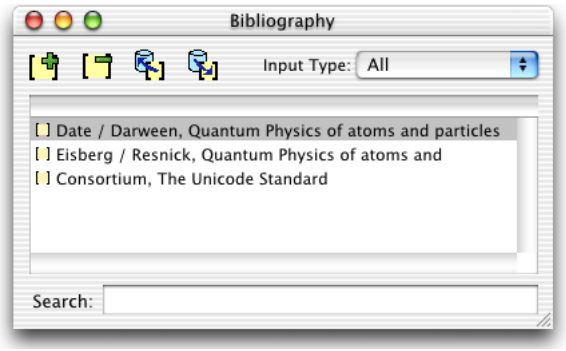
Movies are either represented by icons or by a movie viewer depending on your settings in the preferences. A movie presented by an icon might be dragged to the finder or into your mail program. A movie presented in a viewer can be played directly within your document.

The handling of movies in ScientificAssistant is to some extend discussed in Section 1.

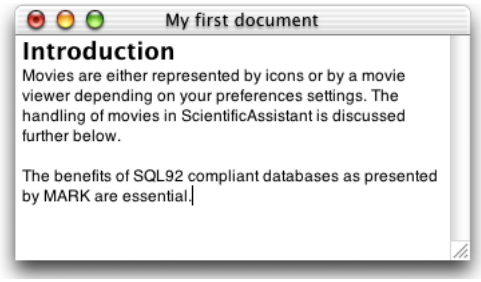
You can adjust the settings on the *LaTeX* page in the preferences arbitrarily if you don't like the default behaviour. You for example might want to remove the page reference in the label for links targeting figures.

2.5.12.2 Citations

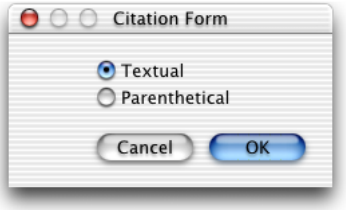
Authors of scientific documents often need to quote other publications. ScientificAssistant comes with a built-in bibliography database that allows to manage bibliography entries efficiently. The creation and maintenance of such a database is discussed in Section 3.5. Here we assume that the database already contains bibliography entries. Choose *File - Bibliography - Show* from the menu to open the bibliography manager.



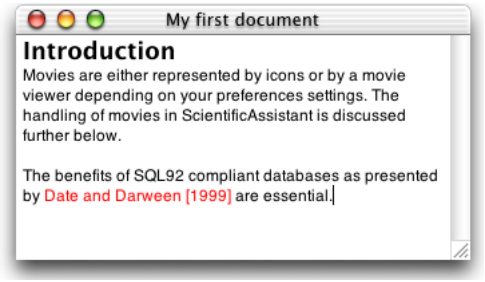
Open any document and enter a sentence that is supposed to contain a citation. Choose *File - Mark Source* from the menu at the location within the sentence where the citation should appear. The keyword MARK is inserted and internally marked as the source for a pending link creation.



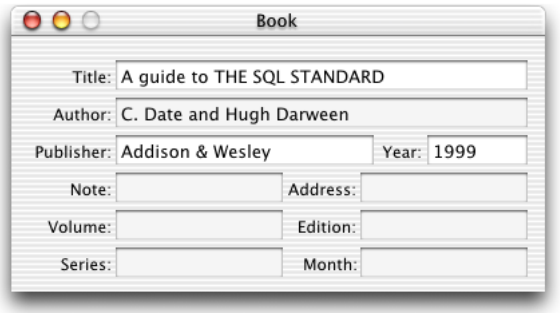
Then go to the bibliography manager (*File - Bibliography - Show*), select an entry and choose *File - Create Link* from the menu to conclude the link creation. The following panel appears.



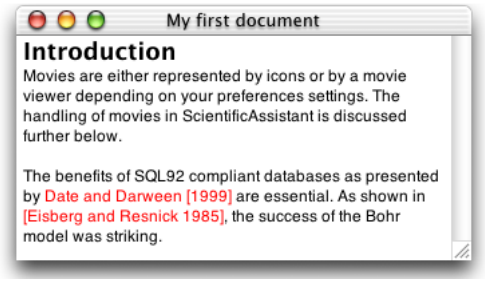
This panel allows to specify the form of the citation. The difference between *textual* and *parenthetical* is discussed further below. Choose *textual* in this case and click on *OK*. The marked text in the source document is replaced with a corresponding citation link.



A singleclick on the citation opens the targeted bibliography entry for inspection. Each bibliography input type has its own set of fields.

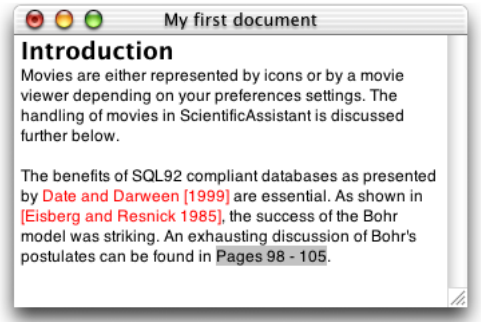


Enter a further sentence referencing a publication but this time choose *parenthetical* for the citation form. The whole citation link including the author is put in brackets.

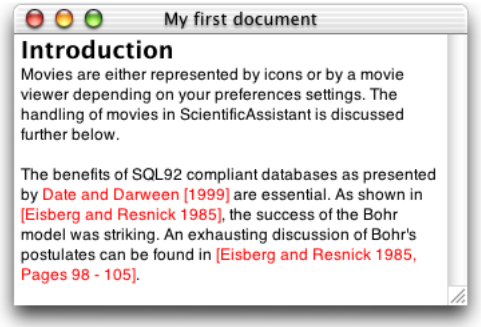


Citations can also be created by simply dragging an entry from bibliography manager to your document. Thus you don't have to mark the source first.

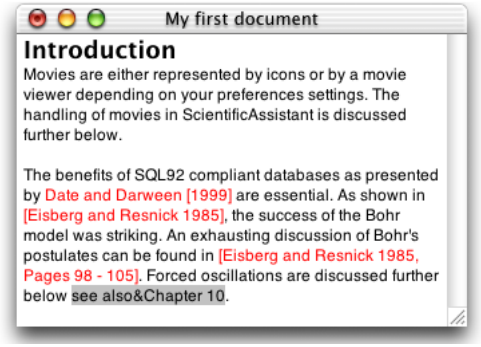
Sometimes authors want to refer to a specific section of a book only or to a specific range of pages in a masterthesis. This can easily be done as follows. Simply type whatever additional information you want to add to a citation into the source document where the citation link is supposed to appear. Then before choosing *File - Mark Source* select this text.



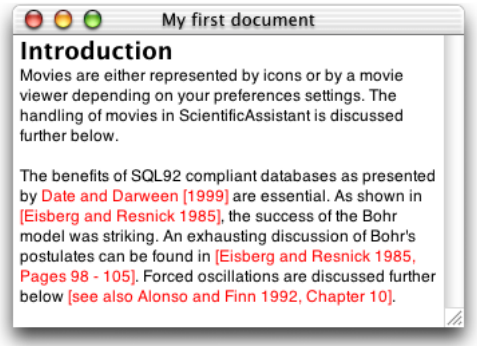
After marking the source go to the bibliography manager, select the entry to be cited and choose *File - Create Link*. The marked text in your document is replaced with a link suffixed by the pages info.



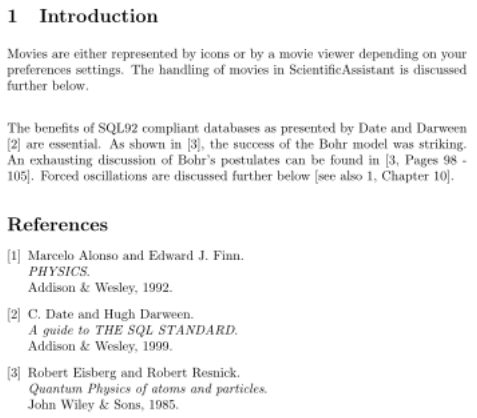
You can even add preceeding text to a link. Prefixes and suffixes are separated by a & sign. Here is an example.



Select text as shown above and choose *File - Mark Source*. Then go to the bibliography manager, select an entry and choose *File - Create Link*. The marked text is replaced with a corresponding citation link.



When generating LaTeX you can choose from a bunch of bibliography styles. A bibliography style determines how citations and the references list look like in the printout. Here is an example PDF generated with the bibliography style set to *Plain Numbers*.



1 Introduction

Movies are either represented by icons or by a movie viewer depending on your preferences settings. The handling of movies in ScientificAssistant is discussed further below.

The benefits of SQL92 compliant databases as presented by Date and Darween [2] are essential. As shown in [3], the success of the Bohr model was striking. An exhausting discussion of Bohr's postulates can be found in [3, Pages 98 - 105]. Forced oscillations are discussed further below [see also 1, Chapter 10].

References

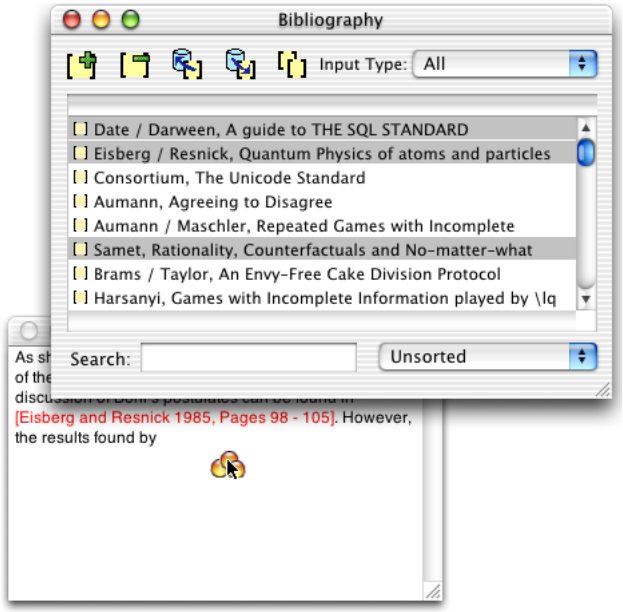
[1] Marcelo Alonso and Edward J. Finn.
PHYSICS.
Addison & Wesley, 1992.

[2] C. Date and Hugh Darween.
A guide to THE SQL STANDARD.
Addison & Wesley, 1999.

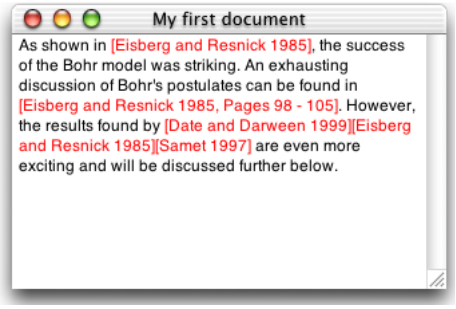
[3] Robert Eisberg and Robert Resnick.
Quantum Physics of atoms and particles.
John Wiley & Sons, 1985.

However, you can also select an alphanumeric or abbreviated style. Even APA is supported. Check out Section 3.2 for more information about generating LaTeX code and bibliography styles.

If no additional info text has to be specified you can also simply drag a bibliography entry from the bibliography manager to your document window. This creates a corresponding citation link at the current cursor position. You can even drag multiple bibliography items at once from the biblioraphy manager to your document.



This creates a multi target citation.



Choose *File - Generate LaTeX...* from the menu, select *Apacite* for the bibliography style and start the *Create LaTeX* subprocess. This generates the following PDF.

As shown in (Eisberg & Resnick, 1985), the success of the Bohr model was striking. An exhausting discussion of Bohr's postulates can be found in (Eisberg & Resnick, 1985, Pages 98 - 105). However, the results found by (Date & Darween, 1999; Eisberg & Resnick, 1985; Samet, 1997) are even more exciting and will be discussed further below.

References

Date, C., & Darween, H. (1999). *A guide to THE SQL STANDARD*. Addison & Wesley.

Eisberg, R., & Resnick, R. (1985). *Quantum Physics of atoms and particles*. John Wiley & Sons.

Samet, D. (1997). *Rationality, Counterfactuals and No-matter-what Theories*. (Faculty of Management, Tel Aviv University, Tel Aviv, Israel)

2.5.13 Theorems

ScientificAssistant offers a feature that allows to typeset mathemathical textual constructs in a special way. This can be definitions, proves, collorars,... Enter the following line of text. Note that the addition in parentheses is optional.

Satz (Bolzano-Weierstrass) Each limited set of real numbers owns a konvergent...

Then triple click on it to select the whole line and choose *File - Theorem* from the menu. This adds the theorem attribute to the selected range. The construct is automatically numbered and formatted as follows.

Satz 2.5.1 (Bolzano-Weierstrass) *Each limited set of real numbers owns a konvergent...*

Such constructs can be trageted by links. Here is an example. According to Satz 2.5.1, each limited set is suitable for our purpose.

2.5.14 Formulas

ScientificAssistant comes with a built-in WYSIWYG-equation editor that allows you insert formulas into documents very easily. Place the cusor where you want the formula to appear, then choose *File - Formula - Insert* from the menu. A small rectangle appears at the current insertion point. Type the contents of the formula, e.g. y, =, a for Eq. 2.1 or z, =, x Ctrl-h, 2 for Eq. 2.2.

$$y = a \tag{2.1}$$
$$z = x^2 \tag{2.2}$$

You can use the cursor keys to navigate within formulas. In order to leave formula mode and continue editing text press the right or left cursor key until the formula is left and the insertion marker appears again.

Don't number formulas yourself, they are numbered automatically. Select a formula by moving the cursor to the formula until it is selected. Then choose *File - Formula - Number*. A label with a unique formula number appears automatically. Make sure to have no spaces nor tabs on either side of a formula if you want it to be centered and labeled automatically.

Create a new formula by choosing *File - Formula - Insert*. Then type V, =, Ctrl-i i, c, o, s, Ctrl-g, a, r, Ctrl-h, 3, press the right cursor key until you are in the differential field and type r. This creates the following formula.

$$V = \int cos\alpha r^3 \; dr \tag{2.3}$$

In formula mode greek characters can be entered by pressing Ctrl-g for selecting the greek character table and then after releasing all keys a for α, b for β, c for χ,... Functions (sind, cos,...) are automatically recognized and formatted

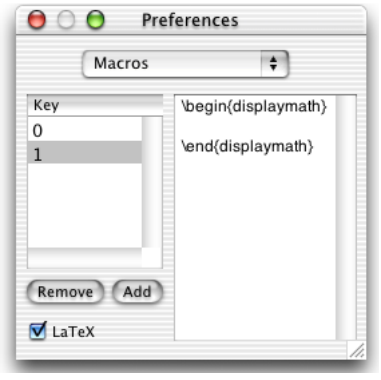
accordingly.

Formulas like Eq. 2.3 can be referenced. In order to create a formula reference place the cursor where you want the reference to appear and choose *File - Mark Source*. The keyword MARK appears. Then click on the formula you wnat to create a link to and choose *File - Create Link*. The formula link is automatically numbered accordingly.

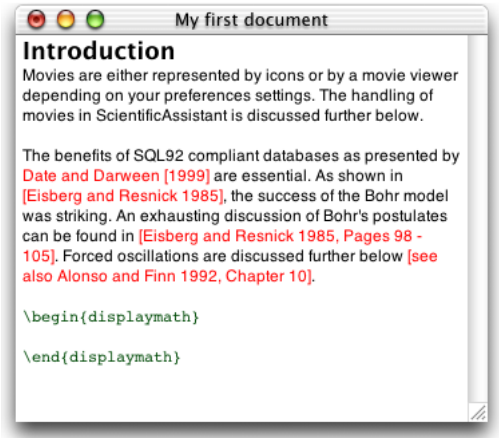
Please note, that the formula feature of ScientificAssistant isn't completed yet and of very limited use so far. We have included it in this release just to give you an idea of what will come. Future versions will come with a more complete equation-editor and also offer palettes.

2.5.15 Macros

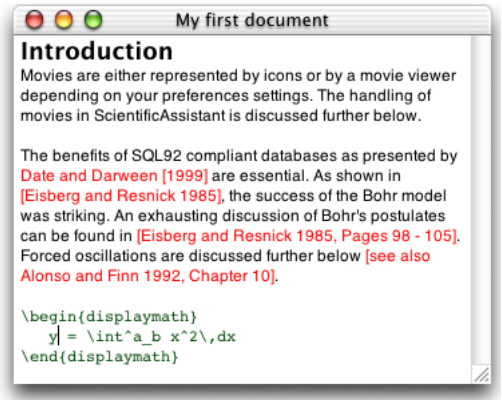
ScientificAssistant allows to define macros for quick insertion of frequently used expressions. The application allows to define simple text macros and LaTeX macros. When hitting the shortcut for a text macro the assigned text is simply inserted at the current cursor position. When hitting the shortcut for a LaTeX macro the assigned text is inserted and additionally put into a LaTeX environment. Open the preferences panel and select the *Macros* page.



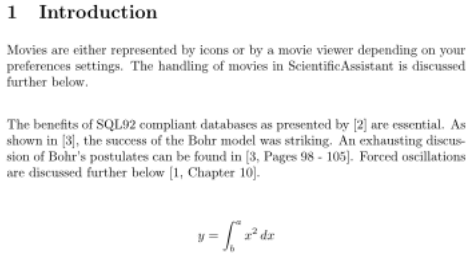
ScientificAssistant comes with two predefined LaTeX macros for inserting LaTeX formulas into documents. Open any document and press Ctrl-x. Release all keys. Enter 1 and hit *Return*. The text assigned to the macro with key 1 is inserted at the current cursor position.



Note, that the macro text in this case is drawn green to indicate the LaTeX environment. Simple text macros are drawn black on white. LaTeX environments aren't translated when generating LaTeX. They are inserted unchanged in the generated tex file. This allows to insert arbitrary LaTeX statements into documents if you have special needs that are not yet directly supported by ScientificAssistant. You can for example make use of the two predefined LaTeX macros for inserting formulas into documents until the WYSIWYG equation editor gets available.



Generating LaTeX for this example produces the following PDF.



1 Introduction

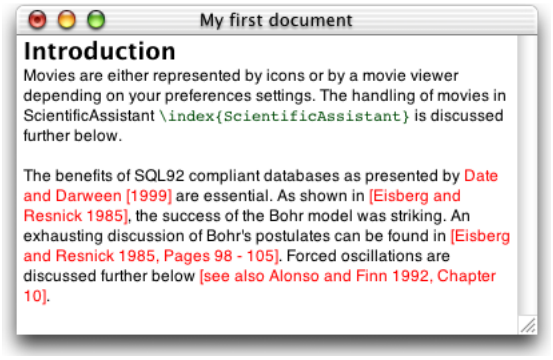
Movies are either represented by icons or by a movie viewer depending on your preferences settings. The handling of movies in ScientificAssistant is discussed further below.

The benefits of SQL92 compliant databases as presented by [2] are essential. As shown in [3], the success of the Bohr model was striking. An exhausting discussion of Bohr's postulates can be found in [3, Pages 98 - 105]. Forced oscillations are discussed further below [1, Chapter 10].

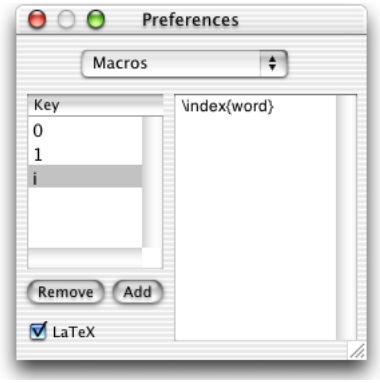
$$y = \int_b^a x^2 \, dx$$

2.5.16 Index

ScientificAssistant can automatically generate an index register for your document or book. This feature is enabled by selecting the corresponding checkbox on the *Create LaTeX* panel. See Section 3.2 for more information about generating LaTeX. However, this requires that you have specified index entries in your document. ScientificAssistant has no special function for this so far. However, you can use the *LaTeX environment* feature to manually add entries. Just type \index{...} into your document where ... is to be replaced with the word you would like to get listed in the index register, select this text and make it a *LaTeX environment* by choosing *File - LaTeX* from the menu.



Note, you can remove the *LaTeX environment* attribute again by choosing *File - Remove Property*. The insertion of index entries can be simplified by defining a corresponding LaTeX macro.



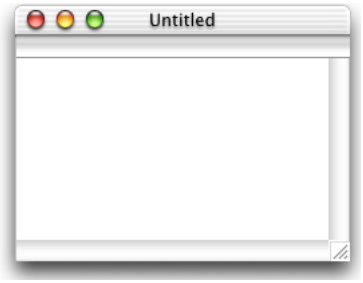
See Section 2.5.15 for more information about defining and using macros.

2.6 Books

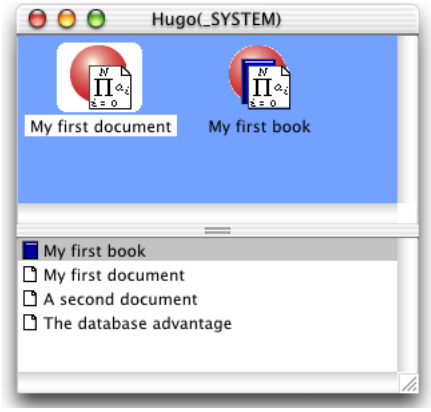
ScientificAssistant allows to arrange documents in books. A book consists of a sorted list of chapters. A chapter consists of a title and a sorted lists of nodes where each node represents a document in the database.

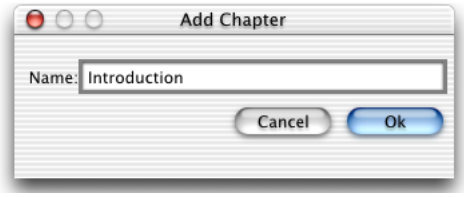
2.6.1 Creating Books

Since ScientificAssistant uses a relational database to store books we have to establish a database connection first. See Section 2.4.5 for more information about creating and connecting to databases. After establishing a database connection choose *File - Book - New* from the menu. The following empty book window appears.

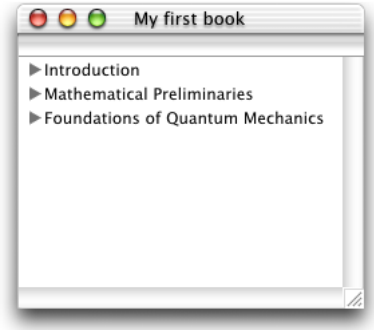


Create a first chapter by choosing *File - Book - Add Chapter* from the menu or pressing *Command-C*. The following panel appears.





Enter a chapter title and click on *OK*. Add a few more chapters and save your changes. You will be asked for a book title. The book window might look as follows now.

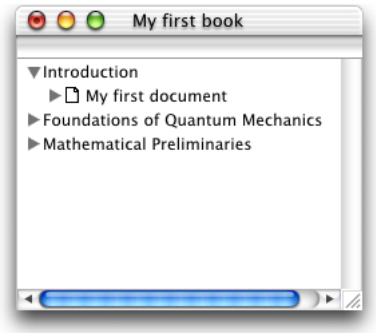


You can change the order of chapters anytime by dragging them to a desired position.

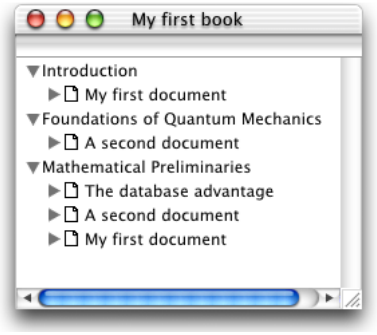
2.6.2 Editing Books

Activate the session window, roll out the fetch drawer by choosing *File - Fetch...* from the menu and click on *Fetch* in order to fetch the newly created book. Then drag the book from the fetch view to the bookmark view. Your session window might look as follows now.

Doubleclick on the icon titled *My first book* in the bookmark view in order to open the book if it has been closed in the meanwhile. Then drag *My first document* from the tableview of the session window to the book window and drop it just below *Introduction*. The book window looks as follows now.



Drag some more documents to the book window. You can even have the same document in multiple chapters although this usually makes no sense. We do it anyway just for demonstration purposes and in order to have some documents to drag around.

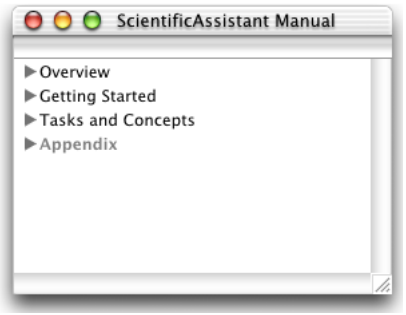


The order of the documents within a chapter can be altered by simply dragging them around. If you want to remove a document or chapter from a book select it and press *Command-x*. Note, that this only removes the reference to the document from the book. It does not delete the document itself. If you really want to remove a document from the database, fetch it in the session window, select it in the tableview and press *Commend-x*. If you want to rename a chapter, doubleclick on it and enter a new title. A doubleclick on a document in the book window opens the document. Document titles and other attributes can be altered in the document inspector. See Section 2.5.2 for more information about inspecting documents.

The navigation commands discussed in Section 2.5.5 also work for expanding and collapsing items in a book window. Choose *Document - File - Expand* from the menu to expand all items at once and *Document - File - Collapse* to collapse them again.

2.6.3 Appendix

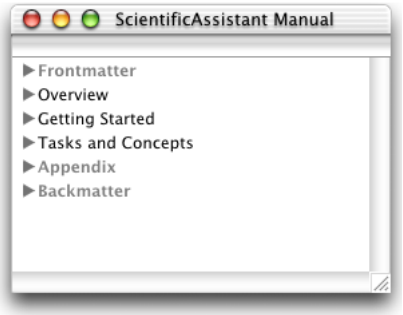
You might want to add an appendix to your book. Choose *File - Book - Add Appendix* from the menu. Your book window might look as follows now.



An appendix is a special kind of a chapter that can contain an arbitrary number of documents. Note, that you cannot modify the name of this special chapter. Attach some documents to *Appendix* and generate LaTeX code. Documents attached to Appendix appear in a special part at the end of the book and are numbered with uppercase letters.

2.6.4 Frontmatter & Backmatter

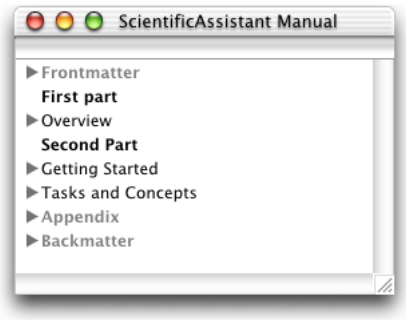
You can add two more special chapters to your book that allow to have introducing documents in the front of the book like *Preface to the first edition*, *Preface to the second edition*,... - and concluding documents at the end of the book behind the appendix like *Epilogue*,... Open any book and choose *File - Book - Add Frontmatter* and *File - Book - Add Backmatter* from the menu respectively. Your book window might look as follows.



Now create a document titled *Preface to the first edition* and attach it to *Frontmatter*. Create a documet titled *Epilogue* and attach it to *Backmatter*. Generate LaTeX to see the effect.

2.6.5 Parts

LaTeX has an additional feature to structure chapters within the mainmatter of a book. You can combine chapters to parts. The first part of a book might consists of the first three chapters, the second part of the rest of the chapters and so on. A part in ScientificAssistant is just a marker with a title that results in a special parts page when generating LaTeX. In order to add a part choose *File - Book - Add Part* from the menu. You are asked for a title. After adding two parts and dragging them to suitable locations your document might look as follows.



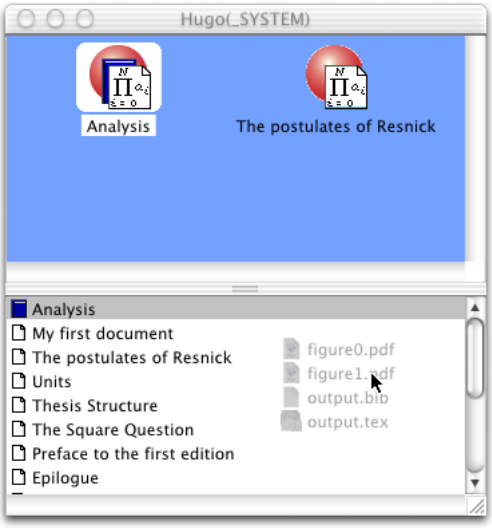
You cannot attach documents to parts. Parts just divide books into chunks of chapters according to their position. Generate LaTeX for your book to see the effect in the printout.

2.7 Folders

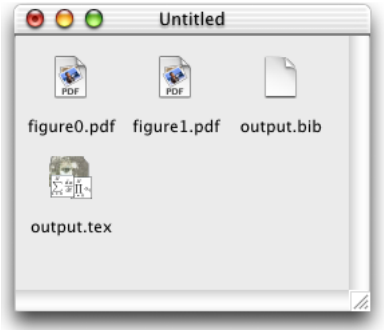
ScientificAssistant comes with a very handy feature for managing sets of files. This could be used to organize tex files, archive html documents or manage project sources in the database. The files are actually stored in the database, not only links. A doubleclick on an icon opens the file in its default application. ScientificAssistant monitors the status of files in opened folders and automatically realizes modifications performed by other applications.

2.7.1 Managing TeX files

Assume a friend of yours sent you a tex file accompanied by a bunch of resources (bib, eps, pdf,...). ScientificAssistant allows to store such a set of files in the database and treat it like any other ScientificAssistant document or book. You can specify a title, assign categories, grant privileges and so on. Select some files in Finder.app and drag them to your session window.

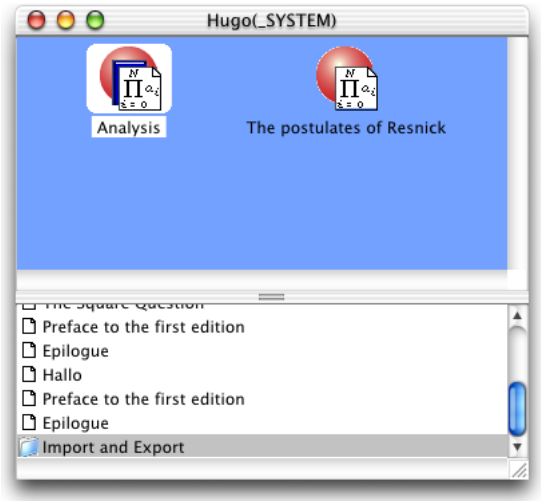


ScientificAssistant creates a new folder object and automaticaly adds the dragged files.



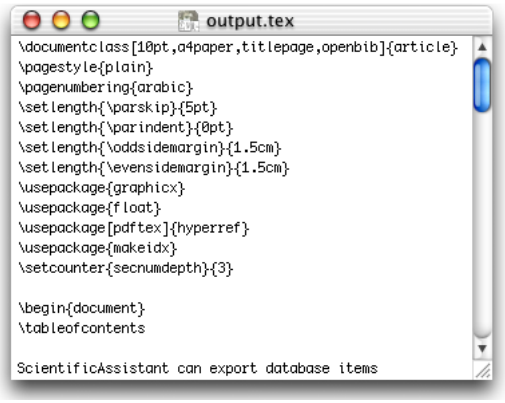
You can remove selected files from a folder by choosing *Edit* - *Delete* or add files by simply dragging them onto the folder window. Choose *Database* - *Save* to store the folder in the database. You are asked for a title.

Enter something meaningful and click on *OK*. The folder appears with a corresponding icon in the tableview of your session window.

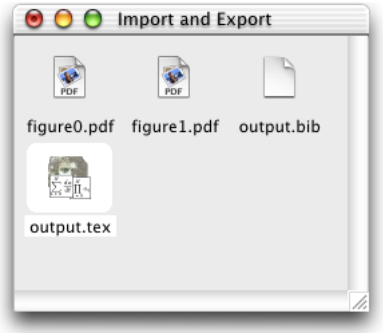


You might want to create a bookmark for this folder by dragging the folder row to the bookmark view. You can inspect the folder by choosing *Tools - Inspector* in order to view attributes, assign categories and grant privileges.

If you set ScientificAssistant as the default application for tex files, a doubleclick on the tex file on the folder window opens the *Compile LaTeX* panel of ScientificAssistant. A click on the start button compiles the tex file in place and opens the resulting PDF file in Preview.app. If you set any other application as the default for tex files this application is launched instead - e.g. TeXShop - allowing you to edit the tex file. Alternatively you can simply drag the tex file from the folder window onto the icon of any application that is able to open text files, e.g. TextEdit.app.



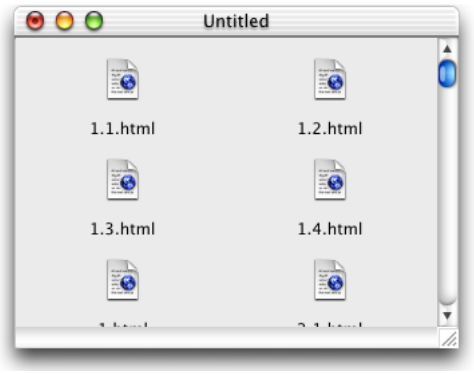
Do some modifications and hit save. Note, that the folder window is set edited automatically. ScientificAssistant checks the temporary directory of open folders every few seconds for added, removed and modified files.



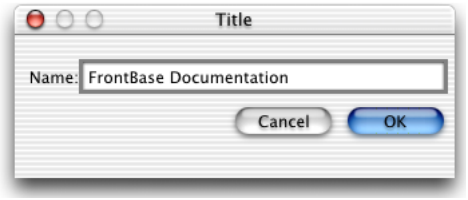
Select the folder window and choose *Database* - *Save* to save the modifications in the database.

2.7.2 Managing HTML files

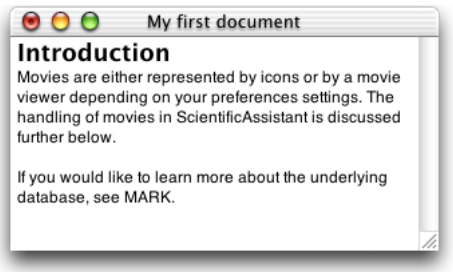
A further application of the folder feature would be to manage html documents together with accompanying images. Assume you have downloaded some documentation consisting of a bunch of html files and images. Create a new folder by choosing *File* - *Folder* - *New* from the menu, select all these files and drag them onto the folder window.



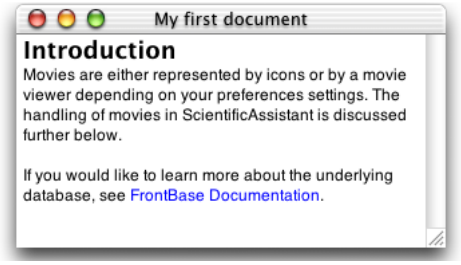
Choose *Database* - *Save* from the menu and specify a title for the new folder.



Folder files can be referenced by links. Open any ScientificAssistant document and enter text that is supposed to contain a link to the FrontBase Documentation. Choose *File* - *Mark Source* to mark the source of the link in the document.

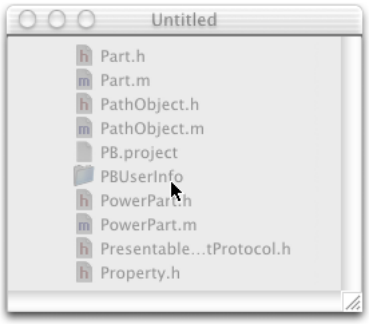


Then select the *index.html* file on the folder window and choose *File* - *Create Link* from the menu. The key word MARK is replaced with a corresponding folder link. Clicking on this link opens the folder window and selects the targeted file. A doubleclick on this file opens the documentation in your web browser.



2.7.3 Managing Project sources

You could even use the folder feature to manage project sources. Suppose you have a ProjectBuilder.app project on your hard disk and would like to store it in the database for later retrieval. Just create a new folder by choosing *File* - *Folder* - *New* and drag all the project files to the folder window.



This copies the files from the project directory to the temporary directory maintained by the folder object. Remember that ScientificAssistant is monitoring all changes in this directory and automatically updates the folder object if the files in this directory are modified. Choose *Database* - *Save* to save changes.

A doubleclick on PB.project in the folder starts ProjectBuilderWO.app.

Chapter 3

Tasks and Concepts

3.1 Scaling Text

ScientificAssistant allows to scale text in document windows. If you find the text hard to read choose *Display->Zoom In* until you are comfortable with the text size. Note, that scaling does not alter document attributes. Zooming in or out will not change the text size on the printout.

If you would like documents to be scaled by default, go to the *Miscellaneous* page of the preferences panel and make your selection in the *Document Presentation* box.

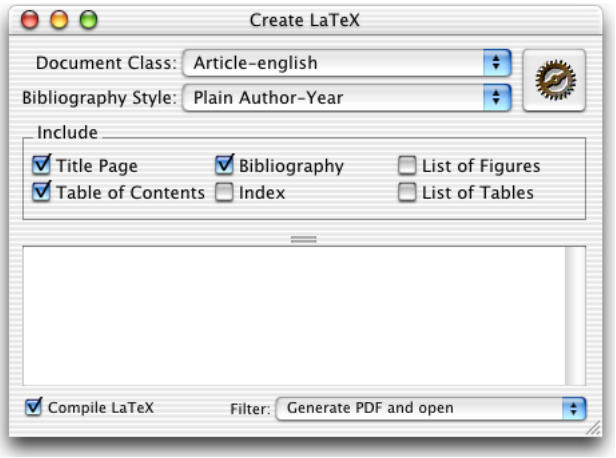
3.2 Generating LaTeX

LaTeX is a high-quality typesetting system, with features designed for the production of technical and scientific documentation. LaTeX is the de facto standard for the communication and publication of scientific documents. LaTeX is not a word processor! Instead, LaTeX encourages authors not too worry too much about the appearance of their documents but to concentrate on getting the right content. LaTeX is based on the idea that it is better to leave document design to document designers, and to let authors get on with writing documents. TeX the foundation of LaTeX has been developed by Donald E. Knuth. LaTeX an application of TeX has been developed by Leslie Lamport. Both are available for free for almost any platform.

When it comes to printing, ScientificAssistant makes use of the high-quality typesetting capabilities of LaTeX. ScientificAssistant automatically generates and compiles LaTeX code in the background. This allows ScientificAssistant users to produce professional looking printouts without having to know or learn a cryptic typesetting language.

3.2.1 Printing documents

Open any document or book you want to print and choose *File - Generate LaTeX...* from the menu. The following *Create LaTeX* panel appears.



Click on the *Start* button in the top right corner to start the *Create LaTeX* process. LaTeX code for your document or book is generated and compiled according to the selected filter. The log textview lets you keep track of the progress. If the filter contains a corresponding statement the generated PDF file is automatically opened in your default viewer.

If the *Compile LaTeX* switch is selected the generated LaTeX code is written into a temporary directory (/tmp/src) followed by the execution of the selected filter. A filter is a script usually containing statements for compiling the generated LaTeX code and converting it into any desired format (PS, PDF,...). However, this script can contain arbitrary additional statements e.g. for opening the resulting PDF file in a viewer or sending the generated PS file to a PostScript printer.

If you are rather interested in the generated LaTeX code than in the compiled PDF or PostScript deselect the *Compile LaTeX* switch. You are asked for a destination directory for the generated files (tex, bib, pics,...) as soon as you start the process.

Doubleclicking on a tex file in finder automatically starts ScientificAssistant if it has been set as the default application for tex files. You can't import tex files into ScientificAssistant yet but you can use ScientificAssistant to quickly compile a tex file in place.

3.2.2 Customizing the title page

You decide whether ScientificAssistant is supposed to also generate a title page for your document by checking or not checking the *Include Title Page* switch on the *Create LaTeX* panel. If this switch is selected a title page is generated

according to the author information you specified or that has automatically been set for the document. See Section 2.5.2.4 for more information about manually adding authors to your document. A title page for a document with two authors might look as follows.

The benefits of computer aided science

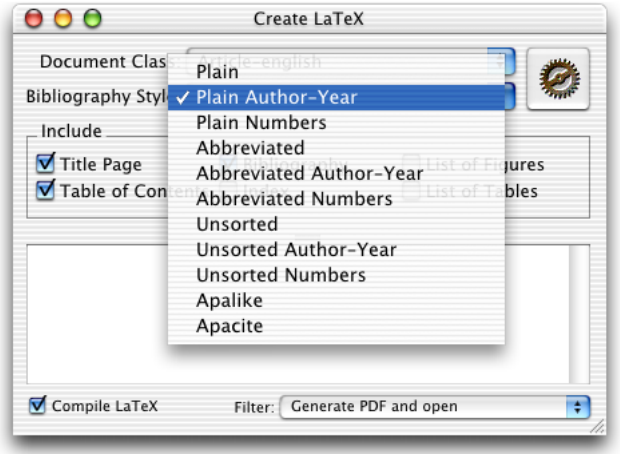
Andreas Höschler
Advanced Science Corporation
15862 S.W. Redclover Lane
97140 Sherwood, Oregon
USA

Karl Lebermann
University of Hamburg
Edmund-Siemers Allee 1
20146 Hamburg
Germany

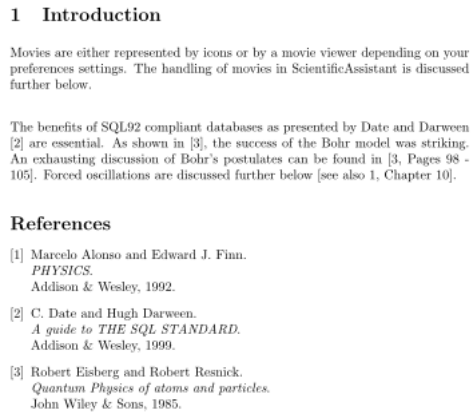
Thu Sep 20 2001

3.2.3 Bibliography styles

In order for ScientificAssistant to append an automatically generated bibliography to your document check the *Bibliography* switch on the *Create LaTeX* panel. If this switch is checked the bliography style popup is enabled allowing you to define one of the predefined bibliography styles. Bibliography styles can be defined on the *Bibliography Styles* page of the preferences panel.



The bibliography style determines the form of citations within the document and in the appended bibliography. Some journals require citations to be in standard form (numbers in brackets) as shown below.



1 Introduction

Movies are either represented by icons or by a movie viewer depending on your preferences settings. The handling of movies in ScientificAssistant is discussed further below.

The benefits of SQL92 compliant databases as presented by Date and Darween [2] are essential. As shown in [3], the success of the Bohr model was striking. An exhausting discussion of Bohr's postulates can be found in [3, Pages 98 - 105]. Forced oscillations are discussed further below [see also 1, Chapter 10].

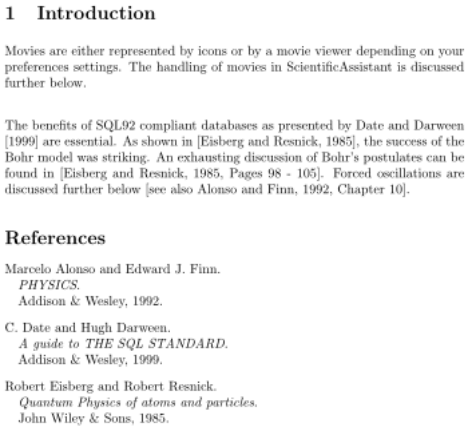
References

[1] Marcelo Alonso and Edward J. Finn.
PHYSICS.
Addison & Wesley, 1992.

[2] C. Date and Hugh Darween.
A guide to THE SQL STANDARD.
Addison & Wesley, 1999.

[3] Robert Eisberg and Robert Resnick.
Quantum Physics of atoms and particles.
John Wiley & Sons, 1985.

Other journals prefer an alphanumeric style with author and year information the citation. See the figure below for a document compiled with the bibliography style set to *Plain Author-Year*.



1 Introduction

Movies are either represented by icons or by a movie viewer depending on your preferences settings. The handling of movies in ScientificAssistant is discussed further below.

The benefits of SQL92 compliant databases as presented by Date and Darween [1999] are essential. As shown in [Eisberg and Resnick, 1985], the success of the Bohr model was striking. An exhausting discussion of Bohr's postulates can be found in [Eisberg and Resnick, 1985, Pages 98 - 105]. Forced oscillations are discussed further below [see also Alonso and Finn, 1992, Chapter 10].

References

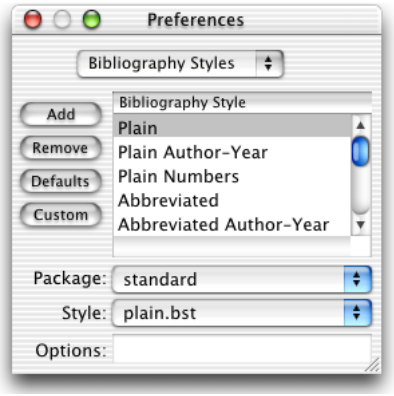
Marcelo Alonso and Edward J. Finn.
PHYSICS.
Addison & Wesley, 1992.

C. Date and Hugh Darween.
A guide to THE SQL STANDARD.
Addison & Wesley, 1999.

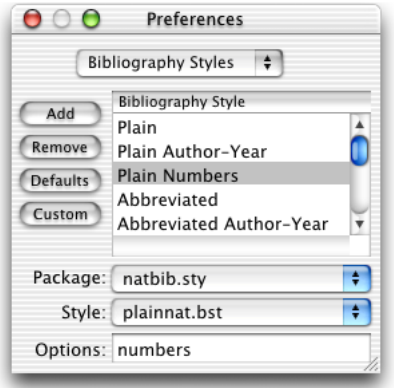
Robert Eisberg and Robert Resnick.
Quantum Physics of atoms and particles.
John Wiley & Sons, 1985.

Figure 3.1: A document compiled with the bibliography style set to *Plain* Author-Year.

ScientificAssistant allows to generate PDF files for all journals from one source. Just select the desired bibliography style on the *Create LaTeX* panel before starting the generation process. If none of the predefined bibliography styles fits your needs you can add your own styles. Open the preferences panel and select the *Bibliography Styles* page.



If you have found a special *.sty or *.bst file on the web that you would like to use with ScientificAssistant, click on the *Custom* button. In the file dialog select your customized *.sty or *.bst file. It will appear either in the package or in the style popup depending on its extension. Now click on *Add* to create a new style. Change its name to something meaningful and make your selections in the package and style popup. You can even add an options string that is automatically addded to the usepackage command while generating LaTeX.

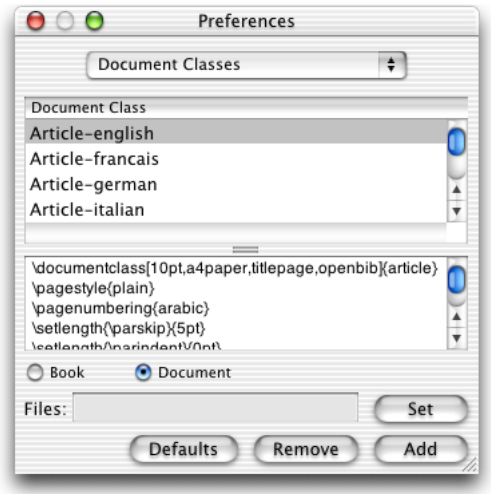


For example when generating LaTeX with the bibliography style set to *Plain Numbers* ScientificAssistant adds *usepacke[numbers]*{*natbib*} to the preambel and uses *bibliographystyle*{*plainnat*} for the bibliography.

3.2.4 Arbitrary customizations

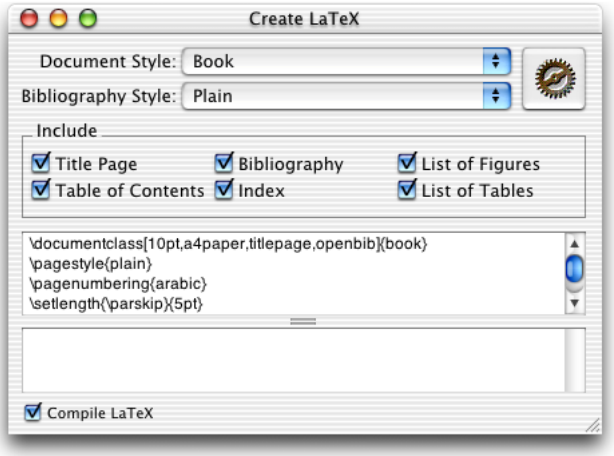
Future versions of ScientificAssistant will give you more control over the generation of LaTeX with corresponding user interfaces. However, if you have a basic understanding of LaTeX and want to customize settings that are not yet covered by the interface, you can do so by editing the LaTeX preamble before starting the generation process. ScientificAssistant comes with a set of predefined document classes that can be viewed and modified on the *Document Classes* page

of the preferences panel.



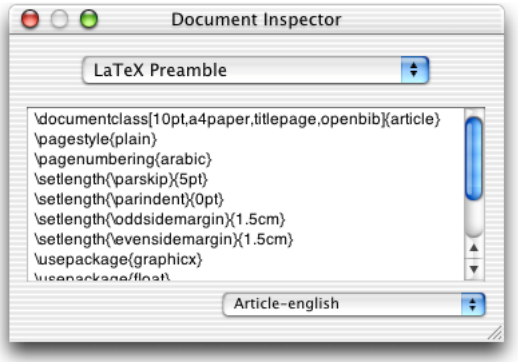
A document class consists of a name, preamble text and an optional path pointing to a directory containing files that are needed during the compilation. You can for example define your own *.cls file with references to further files PDF, EPS,... Simply put all these files into a directory, click on the *Set* button on the above panel and select the directory in the upcoming file dialog. ScientificAssistant automatically copies all files in this directory to the working directory containing the generated LaTeX sources before starting the compilation process.

Select a document class by clicking on the document class popup button on the *Create LaTeX* panel. Note the slider at the top of the textview below the switch matrix. Drag this slider down. The textview above the slider shows the preamble text of the selected document class.



If you would like to permanently customize a predefined document class do so on the *Document Classes* page of the preferences panel. If you would like to customize the preamble for the forthcoming compilation process only do your modifications in the preamble textview of the *Create LaTeX* panel. You for example might want to increase the base point size from 10pt to 12pt. To do so simply edit the first parameter of the \documentclass statement from 10pt to 12pt before starting the process. You can modify the width of the margins (oddsidemargin, evensidemargin) or perform whatever other customizations as long as you know the corresponding LaTeX sequence.

If you perform modifications to the preamble on the *Create LaTeX* panel these changes have effect for the current session only and get lost as soon as you close the *Create LaTeX* panel. As mentioned you can modify or add document classes on the *Document Classes* page of preferences panel. However, you can also attach a customized preamble to any document or book. Open the document or book you want to attach a customized preamble to and select the *LaTeX preamble* page on the document inspector.



Select one of the predefined document classes in the popup below the textview as a start, perform your modifications and save your document or book. This stores the customized preamble in the database. If you open the *Create LaTeX* panel for a document or book with a customized preamble, the document class popup will be disabled since ScientificAssistant uses the customized preamble in this case.

3.2.5 Filters

ScientificAssistant comes with a set of predefined scripts (generatePDF, generatePostScript,...) located in its Resources folder .../ScientificAssistant.app/Contents/Resources. These scripts are used to compile the generated LaTeX code. For example the script generatePDF looks as follows:

```
#!/bin/csh
setenv PATH /usr/local/teTeX/bin/powerpc-apple-darwin-current:$PATH
pdflatex $1
bibtex $1
```

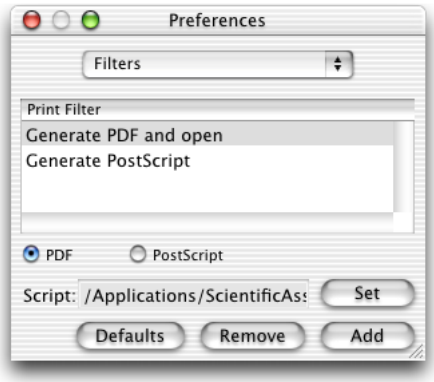
pdflatex $1
pdflatex $1
open $1.pdf

The second line adds the bin directory of the LaTeX distribution to the PATH environment variable. If you do not use the teTeX distribution supplied by Advanced Science Corporation make sure this path points to the correct directory. Otherwise generating LaTeX might fail. Check the paths in the files generatePostScript, generatePDF, generatePostScriptWithIndex, generatePDFWithIndex and convertEPSScript. If you change these files make sure they remain executable. You might have to enter "chmod u+x,g+x,o+x generateXXX" on the command line to set the execute flag.

When called by ScientificAssistant the above script is passed a single parameter, the name of the generated tex file that is to be compiled. So the third line of the script runs the tex file through pdflatex. After this first compilation we have to run bibtex and then pdflatex twice again to get the PDF completed with all references. The script finally opens the resulting PDF file in the default application (Preview.app,...).

The script generatePostScript generates a PostScript file instead. Since PostScript cannot be viewed on MacOSX this script has no open statement. Attach the generated PostScript file to an email, manually send it to a PostScript printer or do whatever you like.

Filters are configured on the *Filter* page of the preferences panel. The scripts coming with ScientificAssistant are automatically available on the *Create LaTeX* panel. However, you can also add your own scripts to customize the print process and make it meet your individual requirements.

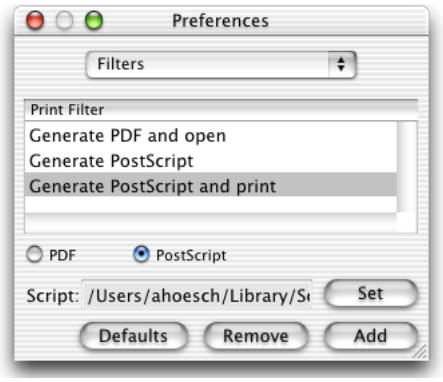


Assume you want to print a document on a PostScript printer attached to a remote host. Provided the print queues are configured accordingly you can accomplish this with the following script.

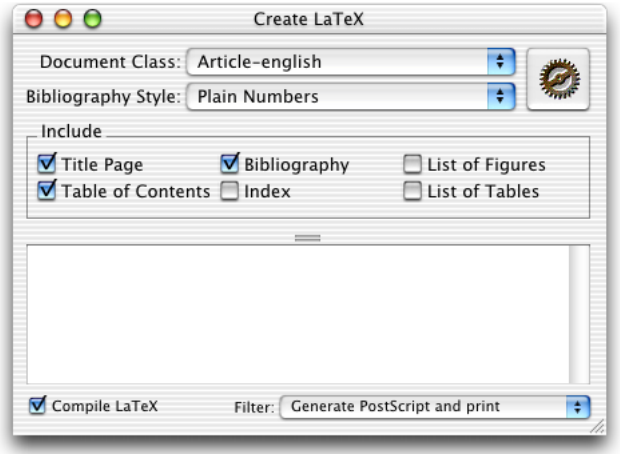
#!/bin/csh
setenv PATH /usr/local/teTeX/bin/powerpc-apple-darwin1.3.7:$PATH
latex $1
bibtex $1

```
latex $1
latex $1
dvips $1 -o
lpr -P HP $1.ps
```

Create a new ASCII file with pico on the command line or with TextEdit.app and enter (copy/paste) the statements above. We assume that a print queue *HP* exists on localhost. Save the script as e.g. *generatePSAndPrint* and make it executable (chmod u+x,g+x,o+x createPSAndPrint). Then click on the *Add* button on the *Filter* page of the preferences panel and change the name from Untitled to *Generate PostScript and print* or whatever you like. Click on the *Set* button and select your script. The selected script must be executable, otherwise it is rejected. Select PostScript in the radio matrix below the tableview. This causes ScientificAssistant to generate eps for all figures (TIFF, GIF,..) instead of PDF. If your script uses pdflatex to generate pdf select PDF instead.



Open the *Create LaTeX* panel for any document or book. The newly configured filter should show up in the popup below the log view now.

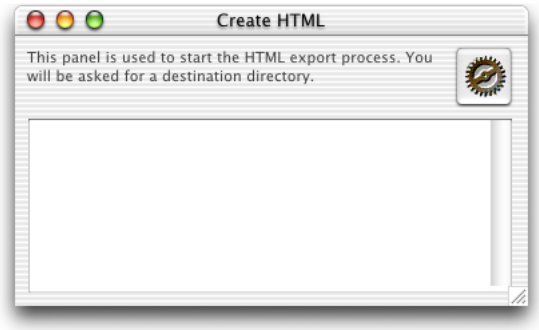


Clicking on the start button first generates LaTeX and then executes the script

generatePSAndPrint sending the generated PostScript file directly to the printer.

3.3 Generating HTML

ScientificAssistant is also able to generate HTML for documents and books. Since equations are stored in MathML in ScientificAssistant this feature might become very intersting for online publications as soon as web browsers get available that natively understand MathML. For now formulas are converted to little GIF images when generating HTML. Open any document you want to create HTML for and choose *File - Generate HTML...* in the menu. The *Create HTML* panel appears.



Click the *Start* button to start the background process. You are asked for a directory in which to store the generated files. Enter *Test* or whatever you want, then click *OK* to end the file dialog. This generates a directory Test.sahtml containing all generated html files and images. ScientificAssistant generates PNG images by default. You can change this behaviour on the *HTML* page of the preference panel.

3.4 Import and Export

ScientificAssistant can export database items (documents, books,...) into flat files and thus allows to exchange documents via email. This feature can also be used to synchronize items stored in multiple databases. Assume you usually work on a desktop machine in the lab but would like to take a few documents or books you are currently working on with you on vacation. You can export these items into a flat file, move this flat file to your notebook and import it into a slave database. After returning to the lab you export the modified items from the database on the notebook and import the resulting flat file on your desktop in order to synchronize changes.

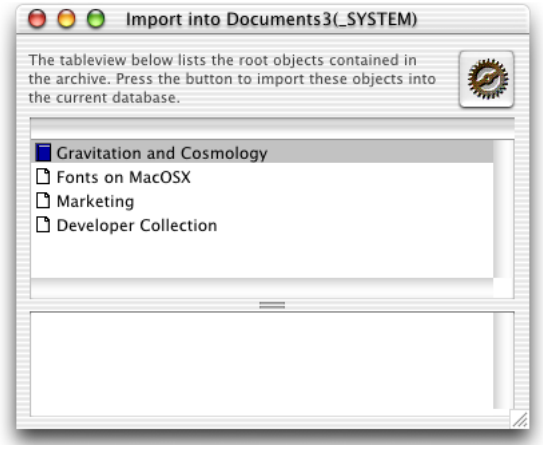
3.4.1 Exporting Items

Establish a connection to the database you want to export from. Select one or more items in the tableview on the session window and choose *File - Export to File...* The following export window appears.

You might want to add additional entries including bibliography entries to the list by simply dragging them from the session window or bibliography manager to the export window. After completing the list click on the start button in the top right corner to start the export process. You are asked for a filename. ScientificAssistant will create a file with the extension sapkg. This file contains all items in a database independet format. However, the primary keys of the items in the local databases are included in the file for late remapping. You may now email this file to a friend or ftp it to your notebook.

3.4.2 Importing Items

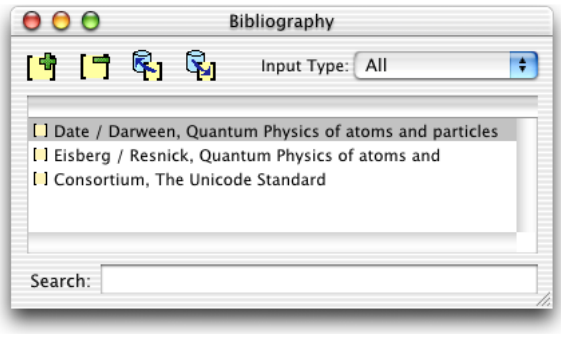
Choose *File - Import from File...* from the menu and select an sapkg file in the upcoming file dialog. The follwing import window appears.



This window allows you to see in advance what items are contained in the archive. Click on the button in the top right corner to start the import process. If the file contains primary keys for the local database ScientificAssistant updates (overrides) these objects. If no matching records are found new objects are created. An sapkg file can contain primary keys for an unlimited number of databases.

3.5 Bibliography

Authors of scientific documents often need to quote other publications. ScientificAssistant allows to build up a sharable bibliography database. Entries in this database can be referenced from documents by all database users. See Section 2.5.12.2 for more information about creating links to bibliography entries. See Section 3.2.3 for more information about bibliography styles. Choose *File - Bibliography - Show* from the menu to open the bibliography manager for the currently active database. The following window appears.

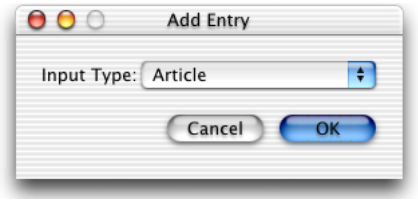


Selecting an input type on the bibliography window triggers a corresponding fetch operation and lists all matching entries in the tableview. If *All* is selected

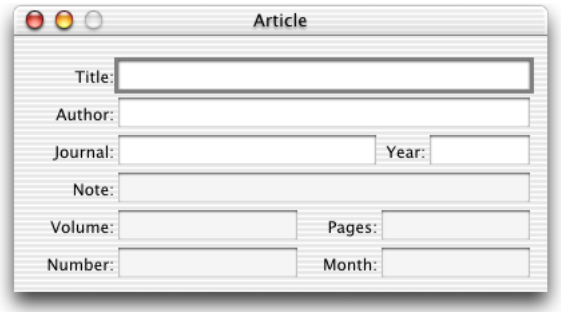
all bibliography entries are fetched regardless of their input type. To further qualifiy the listed entries enter any search string in the text field below the tableview. ScientificAssistant will look for bibliography entries that contain the specified string in the author, title or booktitle field and hide all entries not satisfying this additional constraint. This allows to quickly find a specific entry in the list.

3.5.1 Creating entries

Click on the *New* button on the bibliography manager window in order to create a new entry. The following panel appears.

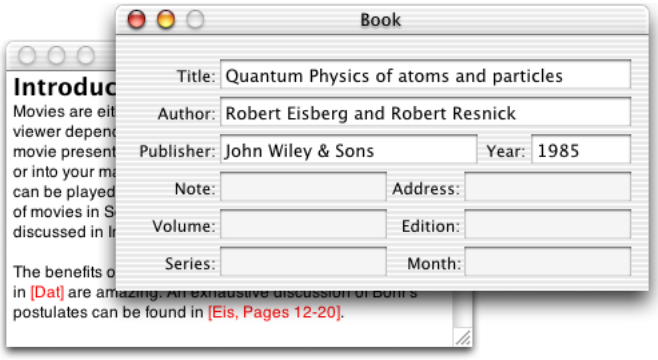


Select a suitable input type in the popup and click on *OK*. A corresponding form appears.



Not all fields need to be filled out but a few are mandatory. Which fields are to be filled out depends on the input type. Please provide values for all fields with a white background. Fields with a lightgray background are optional. If you get a panel like this

make sure you have specified values for all listed fields and try to save again. Once such a bibliography entry is stored in the database it can be used for citing. Citation links are drawn in red. A click on such a link presents the targeted entry in the bibliography viewer.



You can assign an annotation to any bibliography entry. Make sure a bibliography viewer is active like in the figure above. Then choose *File* - *Bibliography* - *Annotation* from the menu. A drawer rolls out on the right side of the bibliography viewer allowing you to view and modify the annotation for the displayed bibliography entry.

Choose *File* - *Bibliography* - *Annotation* to hide the annotaton drawer again if you no longer need it.

3.5.2 Exporting to bibtex

Bibliography entries stored in the database can be exported to a plain bibtex file. Choose *File* - *Bibliogra*y - Show from the menu to open the bibliography manager. Then click on the *Exp*t button. A file dialog appears. Enter a filename and click on *OK*. All displayed bibliography items are written into a bib file of the following form.

@book{1,
author = {C. Date and Hugh Darween},
title = {A guide to THE SQL STANDARD},
year = {2000},
publisher = {Addison \& Wesley}
}
@book{2,
author = {Robert Hermann Eisberg and Robert Resnick},
title = {Quantum Physics of atoms and particles},
year = {1985},
publisher = {John Wiley \& Sons}
}
@book{3,
author = {The Unicode Consortium},
title = {The Unicode Standard},
year = {1999},
publisher = {Addison \& Wesley}
}

3.5.3 Importing from bibtex

Bibliography entries can be created from standard bibtex files. Choose *File* - *Bibliography* - *Show* from the menu to open the bibliography manager and then click on the *Import* button. A file dialog appears. Select any *.bib file containing bibliography entries in bibtex format and click on *OK*. The entries are imported and saved in the database.

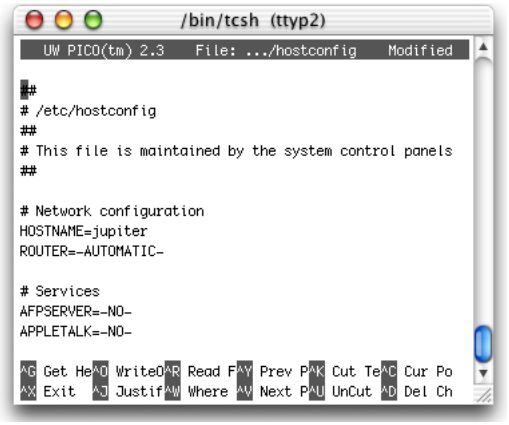
3.5.4 Moving entries between databases

You can easily move bibliography items between databases by dragging them from one bibliography manager window to another one. Create connections to two databases and open the bibliography manager windows. Then select a few bibliography items in one bibliography manager window and drag them to the biobliography manager window of the other database. This has the same effect as exporting the bibliography items into a file and importing the file into the other database.

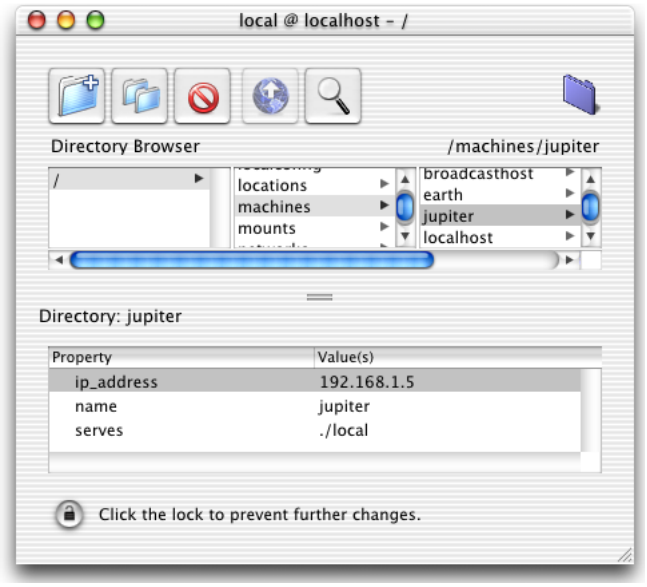
3.6 Troubleshooting

ScientificAssistant is based on FrontBase and FrontBase requires the network to be properly configured in order to run. If you encounter any problems while connecting to databases read this section.

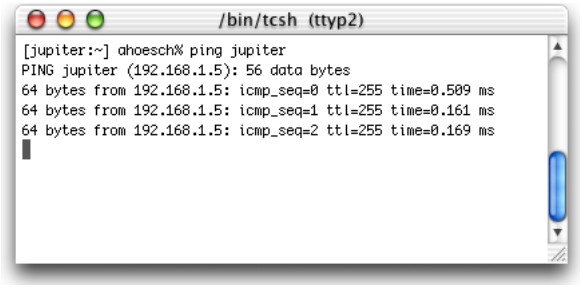
When started ScientificAssistant determines the name of the current host. When opening the dialog for creating or monitoring databases the hostname field is set to this host by default. The hostname can be set by manually editing /etc/hostconfig. Enter *sudo pico /etc/hostconfig* into a terminal session - enter the administrator password if asked for - and make sure the entry for the hostname is correct.



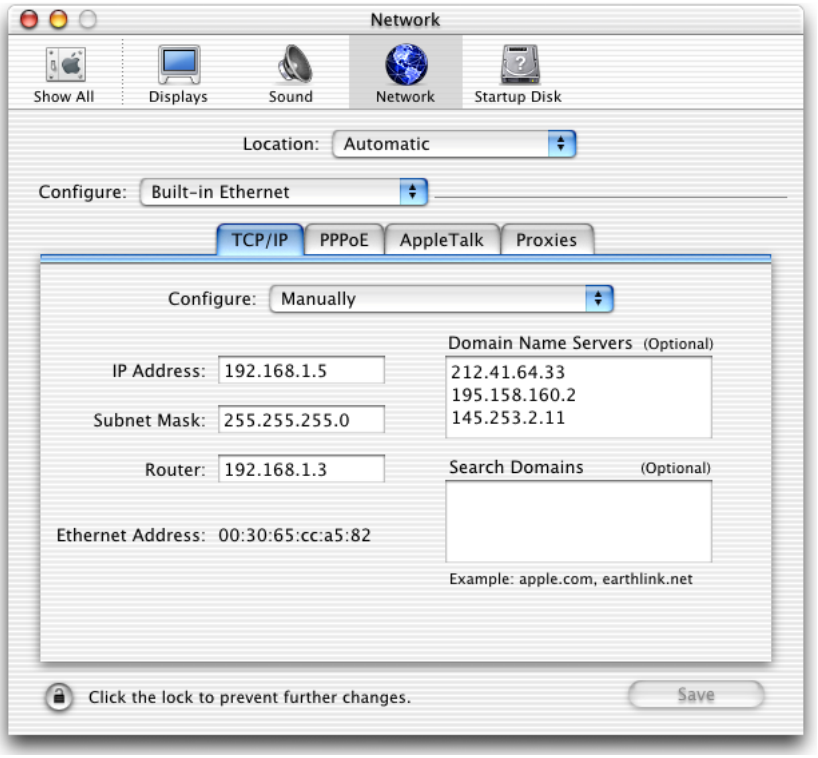
In this example we specified *jupiter* for the hostname. You can of course choose whatever name your are comfortable with. Furthermore we have to make sure that MacOSX can resolv this hostname. Resolving means that MacOSX can find a corresponding numeric IP address. You do this my adding an entry to the netinfo database. Start NetinfoManager.app in /Applications/Utilities and select the machines suitcase.



In this case jupiter is mapped to 192.168.1.5. Pinging jupiter in a terminal session therefore leads to the following result indicating that jupiter is resolved correctly.



As a last step you might want to make sure that this IP address is assigned to the current host. Open *System Preferences* in /Applications and go to the network pane. We have configured our test machine as follows.



This assigns 192.168.1.5 to the current host. At least this host should be listed on the *Select database* panel when you click on *Monitor Database* in ScientifiCAssistant and connecting to databases on jupiter should work fine now.