

Grad Student Time–Saving Tools

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Tool	Description	Reference
Misc Tools		
Unix	<code>cd -, alias net 'netscape &', wc file, grep xx file gzip file, find /home/username -name filename, rm -r</code>	cfa-www.harvard.edu/cf/UserGuide.html man pages
Tar	Reads and writes data tapes, or directories of info into a single file. <code>tar cvf /dev/rmt/4cbn night4, tar xvf file.tar</code>	www.gnu.org/manual/tar/html_mono/tar.html cfa-www.harvard.edu/cf/ref/devices.html
Sed	Stream Editor: handy for replacing strings in a text file: <code>sed s/"&"/" "/ datatable.tex > data</code>	www.gnu.org/manual/sed/html_mono/sed.html
Awk	Great for writing quick hack programs, and parsing text output. <code>cat data awk '{ x=\$1^2*sin(\$2); if (x>\$3) print x, \$4; }'</code>	www.gnu.org/manual/gawk/html_mono/gawk.html
Starbase Tables	Allows ASCII database manipulation; great for bookkeeping. <code>< data.db row 'ra < 12:30:15 && filter=="R"' statstable</code>	cfa-www.harvard.edu/~john/starbase/starbase.html
Scripting	Powerful languages that can use software packages, manipulate files, and do calculations all in one. Scripting is a fast alternative to writing C or Fortran, and allows easy alterations when data processing. Other alternatives such as tcl/tk, guile, javascript, etc abound.	
Shell	Shell scripts are like a series of UNIX commands, with logic statements, loop, variables, and good string manipulation. The limited math capabilities can be supplemented by awk.	www.uwsg.iu.edu/usail/concepts/shell-scripting.html man sh, man csh
Perl	Programming and shell scripting in one, with C–like syntax. Good math capabilities. PerlDL allows fast array calculations ala IDL. Free.	www.perl.org pdl.perl.org
Python	Python is object–oriented (if you want) and has exceptionally clean and easy–to–read syntax. NumPY module allows fast array calculations ala IDL. Free.	www.python.org numpy.sourceforge.net
IDL	A powerful programming language, with Fortran–like syntax. IDL is rather versatile and great for visualizing data. It has great online help. Very expensive.	www.rsinc.com/idl/index.cfm idlastro.gsfc.nasa.gov/homepage.html
Plotting		
Pgplot	Very capable 2–D plotting library. Callable from Fortran, C, and most all scripting languages.	www.astro.caltech.edu/~tjp/pgplot/
SuperMongo	Basic but effective plotting program, it can read ASCII columns and does most math functions.	www.astro.princeton.edu/~rhl/sm/
Astro–Online		
ADS	The NASA Astrophysical Data System. Access catalogs, abstracts, full–text articles, catalogs, and data archives through your web browser. Never go to the library again!	adswww.harvard.edu/
Astro–ph	Un–refereed pre–print server. Check it out for current work in astronomy.	xxx.lanl.gov/archive/astro-ph
Misc Tools	Convert coordinates, dates, energy units and search for bibliographic references.	heasarc.gsfc.nasa.gov/docs/corp/tools.html
DSS	Digitized Sky Survey. Enter an RA and Dec, and retrieve that piece of sky. Great for optical finding charts. The images have astrometric solutions.	archive.stsci.edu/cgi-bin/dss_form

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VizieR	Provides access to the most complete library of published astronomical catalogues and data tables available on line, organized in a self-documented database. Query tools allow the user to select relevant data tables and to extract and format records matching given criteria.	vizier.u-strasbg.fr
LaTeX		
emulate.apj	Include the line "\usepackage{emulateapj5}" in your latex file header, and your document will come out in ApJ journal format. Must use psfig or epsfig for figure placement.	hea-www.harvard.edu/~alexey/emulateapj/
BibTeX	Never write a bibliographic entry again! Use ADS (see below) to get the BibTeX database entries and then simply use \citep{} and \citet{} like usual in your papers.	www.ecst.csuchico.edu/~jacobsd/bib/formats/bibtex.html
Presentation		
XV	Allows one to display a wide range of image formats, crop and scale the image, and save it in a wide range of formats (ps, jpg, gif, etc.)	cfa-www.harvard.edu/cf/ref/xv.html
IslandDraw	Directly edit postscript files. Very easy to use. (edit .cshrc and type 'island')	www.islandssoft.com
Framemaker	Allows one to combine and text, images, math, and basic graphics. Relatively easy to use and great for posters.	www.adobe.com/products/tips/framemaker.html
StarOffice	Read and edit those pesky Word, PowerPoint, and Excel files your friends send you. Very powerful and user-friendly – but quite bloated. Freely available for download for Solaris, Windows, and Linux.	www.sun.com/products/staroffice/
Calculations		
Skycalc	Give it a date and location, skycalc provides sun & moon rise & set times, moon phase, LMST, parallactic angle, an hourmass table, etc.	www.cfht.hawaii.edu/~tmca/almanac.html
Xephem	Similar calculations as Skycalc but with a GUI. Can also generate sky charts.	www.clearskyinstitute.com/xephem/
SLALIB	Library to perform astrometric calculations that is callable from C or Fortran. Many other useful astronomy software packages are available at the Starlink web site.	star-www.rl.ac.uk
WCSTools	WCSTools is a package of programs and a library of utility subroutines for setting and using coordinate systems in the headers of FITS files. Also displays and edit FITS headers.	tdc-www.harvard.edu/software/wcstools.html
Netlib	Netlib is a collection of mathematical software, papers, and databases. The code (mainly in Fortran) is extremely robust. (LAPACK for matrix calcs, QUADPACK for integration, MINPACK for optimization and non-linear least-squares, Cephes for special functions, etc...)	www.netlib.org
Numerical Recipes	Good place to start when working on almost any numerical task. The references will point you to more robust and detailed descriptions and/or code. Code is minimalistic.	www.nr.com
Mathematica	Extremely powerful symbolic and numerical computations. Steep learning curve. Never do algebra or calculus again!	www.wolfram.com