atlas.utils: utility programs for manipulating ATLAS9 i/o

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1. Introduction

The CCP7 program and data library contains a substantial nuber of programs, models and data connected with the calculation of model atmospheres and of synthetic spectra; many of which have been provided by Dr R.Kurucz and are generally associated with his model atmosphere code ATLAS (Kurucz 1970, SAO Special Report No. 309 and subsequent versions). To assist users of these codes and data, CCP7 has provided or adapted a number of minor utilities, principally for

- data-type conversion for model flux grids
- single model extraction from grids of model atmospheres
- intepolation between opacity distribution functions (Unix version)
- interpolation between Rosseland opacity tables (Unix version)
- construction of tar files for exporting model grids
- translation for MIAC - Kurucz' internal 'Machine Independent Alphanumeric Code'

2. Installation

The programs can be obtained from the CCP7 anonymous ftp account in the compressed tar file

ccp7.st-and.ac.uk (138.251.31.5) ccp7/Soft/atlas.utils.tar.Z

This should be unpacked into an appropriate folder; a makefile (SunOS 4.1.2) exists to compile and link the programs.

```
> zcat atlas.utils.tar.Z | tar xvf -
> make
> make install     # optional
```

The program atlas_flux requires subroutines in the library 'sdb' (spectroscopy database tools) which is stored in the tar file **sdb.tar.Z** on the CCP7 anonymous ftp account. If modified appropriately, or if your path includues the folder $CCP7/bin, the last command installs these programs in your local path. Note that on the CCP7 SPARCstation, /ccp7/bin holds ccp7 scripts and binaries, /ccp7/lib is used for shareable libraries.

3. Binary/Ascii conversion of model fluxes

Two programs are available to convert flux files between binary and ascii formats,

fluxasc.f	convert models from binary to ascii
fluxbin.f	convert models from ascii to binary

These programs are supplemented by a pair of C shell scripts allowing the user to process each dataset easily, e.g.

fasc fm01k2	unpacks binary -> ascii (deletes binary)
fbin fp05k2	repacks ascii -> binary (deletes ascii)

4. Extracting individual model fluxes

Another program will list the models in a given (binary) grid and write a selected model out ... currently to 'stdout' ...

```
atlas_flux.f
```

To obtain a single flux distribution as an ascii file (eg):

```
source /ccp7/etc/login       # load shareable libraries
atlas_flux                   # run interactively, output to screen
atlas_flux >file             # run interactively, no prompts, output to file
atlas_flux >file <<%%%       # input from here document, output to file
comp
teff (K)
log g (SI)
%%%
```

NOTE log g reported by the program, and required as input, is in SI units. Therefore subtract 2.0 from the cgs value you were about to use !

It is intended to provide analogue programs atlas_model, atlas_balmer etc., for extracting models, balmer profiles and theoretical colours.

5. Binary/Ascii conversion of odfs

Two programs are available to convert atlas9-type odf files between binary and ascii formats, a third provides useful information about a binary odf.

```
dfasc9.f  convert ascii odf to binary for read by Atlas9
dfbin9.f  convert binary odf to ascii
dflist9.f  list frequencies in binary ODF.
```

The odf conversion programs prompt for an input file (which can be a complete path) and write into the current directory the files ODFBIN (dfascii9) and ODFASC (dfbin9).

Original versions of these programs were kindly donated by Michael Lemke (IoA). They are also packaged in Michael's unix implementation of atlas9.

6. Interpolation in opacities

Kurucz provides utilities for interpolating in odfs and Rosseland mean opacity tables. Unix versions adapted by Michael Lemke (IoA) and packaged in Michael's unix implementation of atlas9 are duplicated here.

```
dfinterp9.f          interpolation in binary odfs
kaprossinterp9.f     interpolation in Rosseland mean opacities
```

7. Model grids as ‘tar’ files

A utility is available on the ccp7 workstation to enable all the models, fluxes, balmers and colours for a given composition to be packed into a compressed tar file and made ready for export by anonymous ftp. The procedure is

```
cd $(CCP7)/atlas/utils
Tar xxx
```

where xxx coresponds to the metallicity (eg p05) in the grid. This will create a file with the name **atlas_xxxk2.tar.**Z (eg atlas_p05k2.tar.Z) in the ccp7 anonymous ftp account.

Users wanting to access a particular composition model grid should simply send a message containing the above two lines to ' csj@st-and.ac.uk '. When the tar file has been created, an acknowledgment will be sent. The tar files, being large, can only be guaranteed to remain online for a limited period.

8. MIAC

ATLAS9 and related programs use an internal ‘Machine Independent Alphanumeric Code’ for identifying keywords in input decks. This is a relic of the days when Fortran required Hollerith variables to be stored as ‘integer variables’ and did not recognise ‘character variables’ (DETAIL and SURFACE also use this internal code). To enable an interested user to decipher what a programme is doing, two very simple programmes are provided (coutesy Keith Butler) for reading and writing ‘MIAC’ keywords, namely

miacw	convert a MIAC integer into its equivalent alphanumeric character string.
miacn	convert an alphanumeric character string into a MIAC integer.
	(Type a 0 or blank to exit the programs)