

RESPECT - SOFTWARE FOR REDUCTION OF SPECTROSCOPIC DATA

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ABSTRACT. We describe the interactive software package RESPECT developed for reductions of astronomical spectroscopic data at the Vainu Bappu Observatory, Kavalur. Each command of RESPECT performs a simple operation on a one-dimensional image. Several commands can be stringed together to perform higher-order operations.

RESPECT is a software package for reductions of photoelectric and photographic spectrophotometric data images. The package is developed on the VAX/VMS version 3.5 installation at Kavalur and is in regular use (see e.g. Ashoka et al. 1987). The package uses the DIGITAL Command Definition Utility which helps in defining commands for each basic operation on the image. Several such commands can be grouped into Command procedures to generate higher order operations. Such operations can also be defined as commands using Symbol Definition, and the parameters required by different commands are passed through Parameter Passing by Symbol Substitution.

Each basic command activates an executable image, written in Fortran 77. Many of the commands are interactive and use the Tektronix Interactive Graphic Library (IGL). Some commands can also be executed using Digital ReGis Graphic Library (RGL). A routine using the Digital PLXY library is available for obtaining plots.

RESPECT commands can be subdivided into three groups:

1. Entry and Exit
2. The basic command set (BASCOM)
3. Spectroscopic extensions (SPEX); which are extended commands of RESPECT for spectroscopic reductions

The commands under the subdivisions BASCOM and SPEX are listed in Tables 1 & 2, respectively, along with their functions. Each of the commands in BASCOM can have additional qualifiers for slight variations in the

TABLE 1
THE BASIC COMMAND SET (BASCOM)

REFORM	-	Interface routine for reformatting data into RESPECT format.
OUTPUT	-	Data in RESPECT format is reformatted to ASCII and printed either on terminal or on the printer.
DISPLAY	-	Graphic display of data on either VT125, VT240 or Tektronix 4115B terminals.
WEEDOUT	-	Interactive deletion of points from data displayed on terminal.
PLOT	-	Plotting on the Printronix printer/plotter.
ADDC	-	Add a constant to data frame.
SUBC	-	Subtract a constant from data frame.
MLTC	-	Multiply data frame by a constant.
DIVC	-	Divide data frame by a constant.
ADD	-	Coadd two frames.
SUBT	-	Subtract two frames.
MULT	-	Multiply one frame by another.
DIV	-	Divide one frame by another.
LOG	-	Obtain logarithm to base 10 of data array.
R10	-	Raise data array to power of 10
MOD2	-	Obtain modulus-squared.
AVER	-	Obtain average of all data points.
RAVE	-	Running average smoothing with constant, triangular or Gaussian weights.
POLFIT	-	Fit a polynomial of order < 5.
GAUSS	-	Fit a Gaussian.
PLNM	-	Construct a polynomial curve.
PSHIFT	-	Transform coefficients of a polynomial under the operation of translation in X.
FILTER	-	Construct a filter with given lower and higher cutoffs.
FT	-	Obtain Fourier transform.
EXAMINE	-	Find coordinates of points on a curve displayed.
WLID	-	Enable measurement of spectral lines.
CTMFIT	-	Determine positions for continuum fit interactively.
LINES	-	Separate spectral lines and obtain peak wavelength, centroid wavelength, FWHM and total area under the curve.
INSTRES	-	Generate instrumental response curve.
ATMEX	-	Obtain extinction curve.
JOIN	-	Join two files.
PAIR	-	Merge a series of X-values and a series of Y-values.
REFLECT	-	Reflect about midpoint.
CENTRE	-	Shift zero position to centre.
REVERSE	-	Reverse data array.
CLIP	-	Trim array between limits specified.
EXTEND	-	Extend array by desired number of points.
REAL	-	Extract real part of a complex array.
IMAGE	-	Extract imaginary part of a complex array.
EXTRACT	-	Extract desired data points.
MAGN	-	Magnify by specified magnification factor.
WSCALE	-	Interpolate at equal intervals between X-data points.
YPRIM	-	Transform sequential data under a polynomial stretching.
CALC	-	Perform arithmetic operations on symbols.

TABLE 2
EXTENDED SPECTROSCOPIC COMMANDS (SPEX)

DENSIT	→	Convert transmission data to densities or Baker densities; or density to Baker density.
CALIB	-	Obtain calibration curve for intensity calibration.
SMOOTH	→	Filter grain noise by Fourier techniques.
OPTIM	→	Obtain optimal filter for noise filtering.
PLOG	-	Obtain log (Power)
PSEG	→	Obtain segmental averaged power spectrum.
BKGD	-	Subtract image-tube background.
LINT	→	Convert density to log (Intensity)
CTMR	-	Reduce to a mean continuum level.
FREG	→	Regularize spectrum through division by an extreme-low-pass filtered data.
CROSCOR	-	Obtain cross-correlation between two frames.
PRTFILE	→	Print on printer.

execution. The qualifiers are, however, not listed here for sake of brevity. A detailed paper is being published elsewhere (Prabhu, Anupama & Giridhar 1987)

REFERENCES

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