10/21/78

Addendum to Image Processing Information Packet

Treatment of Saturated Pixels

Any pixel in the geometrically corrected image which has a DN value equal to 255 is defined to be saturated, since the encoding range for 8-bit pixel values is 0 to 255. During the photometric correction step, any pixel with an input DN of 255 is given an output "flux unit" value of 32767, the maximum possible positive value for a 16-bit halfword pixel value (the 16th bit is reserved as a sign bit). For unsaturated pixels, the maximum flux unit value which is assigned by the photometric correction is a function of the scaling parameters in the Intensity Transfer Function (ITF) for each camera.

Camera	Maximum Unsaturated Flux Unit Value
LWR	25220
SWP	17740

The artificially large flux value of 32767 given to saturated pixels makes them photometrically useless, and plots of extracted fluxes which include contributions from saturated pixels may appear to have spuriously large peaks. All flux points which include saturated pixels are flagged by being plotted with a + symbol on the CalComp output and are given an epsilon (quality word) value between -1600 and -1500 on the magnetic tape files.

It should be emphasized that flux points including saturated pixels are not photometrically trustworthy.

B. Turnrose

10/21/78

Addendum to Image Processing Information Packet

Vacuum-to-Air Wavelength Corrections

- All extracted wavelengths from the SW spectrograph are left uncorrected (vacuum wavelengths).
- All extracted wavelengths from the LW spectrograph are corrected to air values if equal to or greater than 2000 angstroms; extracted wavelengths shorter than 2000 angstroms are left uncorrected (vacuum wavelengths). The formula used to do the correction for wavelengths equal to or greater than 2000 angstroms is:

$$\lambda_{air} = \lambda_{vac} \Big/ f(\lambda_{vac})$$

where $$f(\lambda) = 1.0 + 2.735182 \times 10^{-4} + \frac{131.4182}{\lambda^2} + \frac{2.76249 \times 10^{8}}{\lambda^4}$$

B. Turnrose

11/9/78

Addendum to Image Processing Information Packet

High Dispersion CalComp Plots

Effective November 9, 1978, it is the official policy of the GSFC IUE Project that the standard IUE Guest Observer Data Package will no longer contain the 2Å/inch CalComp plot of the net ripple-corrected spectrum for high dispersion images. This circumstance has been necessitated by the exceedingly large amounts of time required to produce these plots with the present CalComp hardware. Alternative hardware configurations are being considered which might allow plots of this or similar resolution to be reinstated at a future date, but until such time as these alternatives may be implemented, only the two 10Å/inch plots will be provided on a routine basis for high dispersion images.

IUE Guest Observers with a clearly demonstrable scientific need for plots at 2Å/inch may submit special requests directly to the GSFC IUE Project Scientist, Dr. A. Boggess. In the absence of the Project Scientist, special requests may be submitted to the GSFC IUE Observatory Director, Dr. D. West. Only upon the explicit authorization of one of these Project officials can the long 2Å/inch plots be produced. Guest Observers are reminded that even with such special authorization, the turnaround time for delivery of the completed Data Package will be greatly expanded over that required for delivery of the 10Å/inch plots, due to the current hardware constraints. The primary source of reduced data remains the Guest Observer Tape, from which any or all portions of the data may be extracted or displayed, and Guest Observers are strongly encouraged to use the data on these tapes to produce their own plots whenever possible.

IUE ECHELLE RIPPLE CORRECTION

$$F_{corr}(\lambda) = \frac{F(\lambda)\ \text{extracted net}}{R(\lambda)}$$

where $$R(\lambda) = \frac{\sin^2 X}{X^2}\ (1 + a X^2)$$

and $$X = \text{Max}\left\{\frac{\pi\, m^2(\lambda - \lambda c)}{K},\ 2.61\right.$$

$$\lambda_c = K/m$$

m = echelle order number

K = echelle grating constant

a = adjustable parameter

CURRENT VALUES:

	K	a
SWP	137,725	0.10
LWR	231,150	0.09