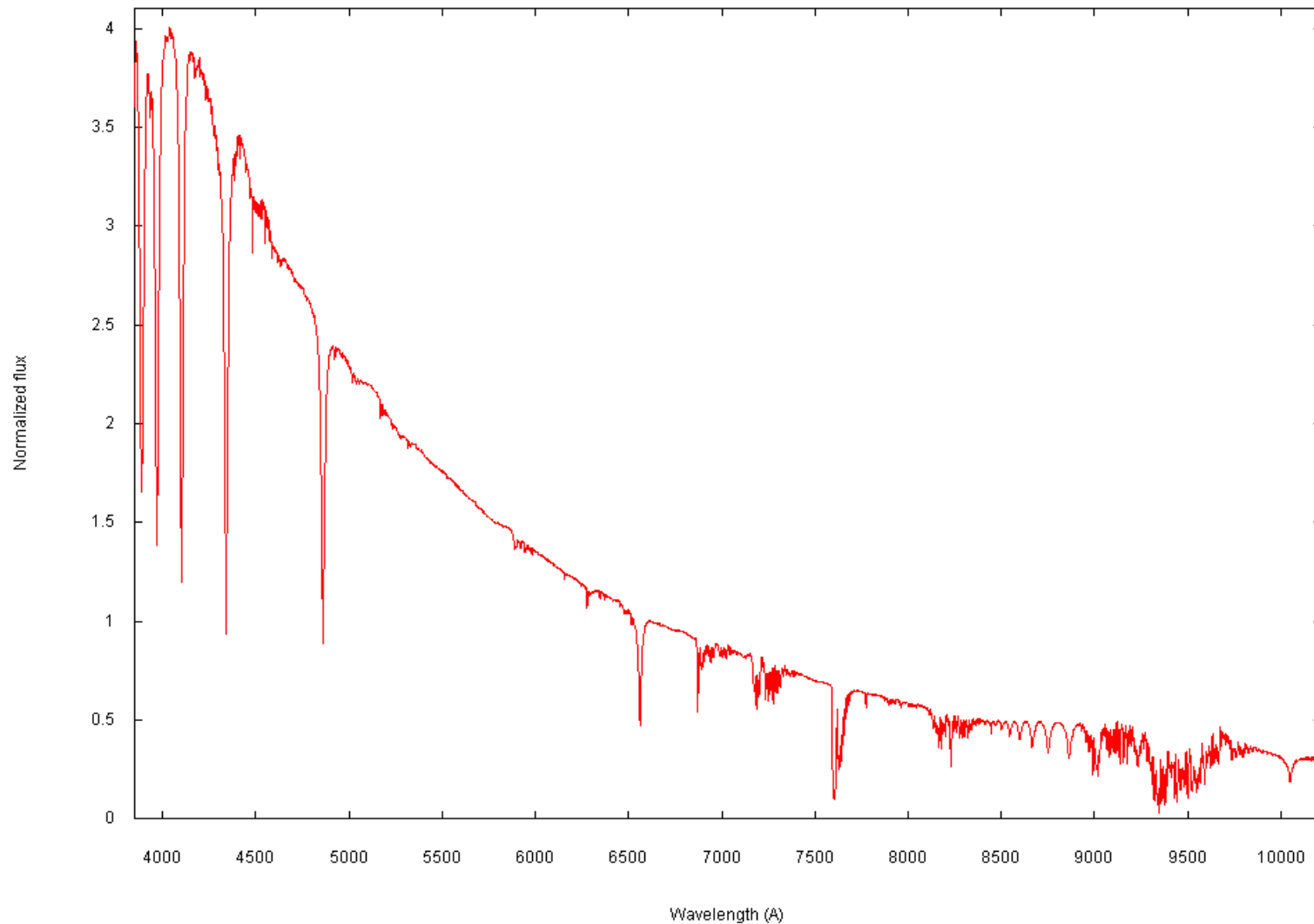


Fluxus kalibráció



Probléma:

a távcső + spektroszkóp + detektor érzékenységi
görbéje hullámhosszfüggő

==> a mért spektrum eltorzul

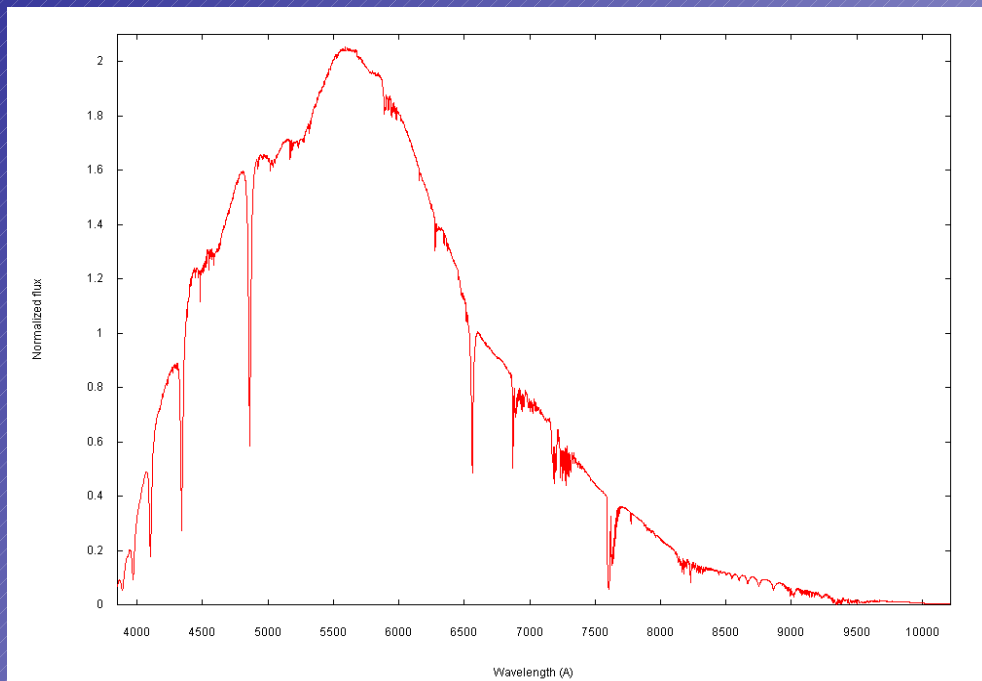
$$F(\lambda) = S(\lambda) \cdot G(\lambda)$$

Megoldás: fluxus-kalibráció

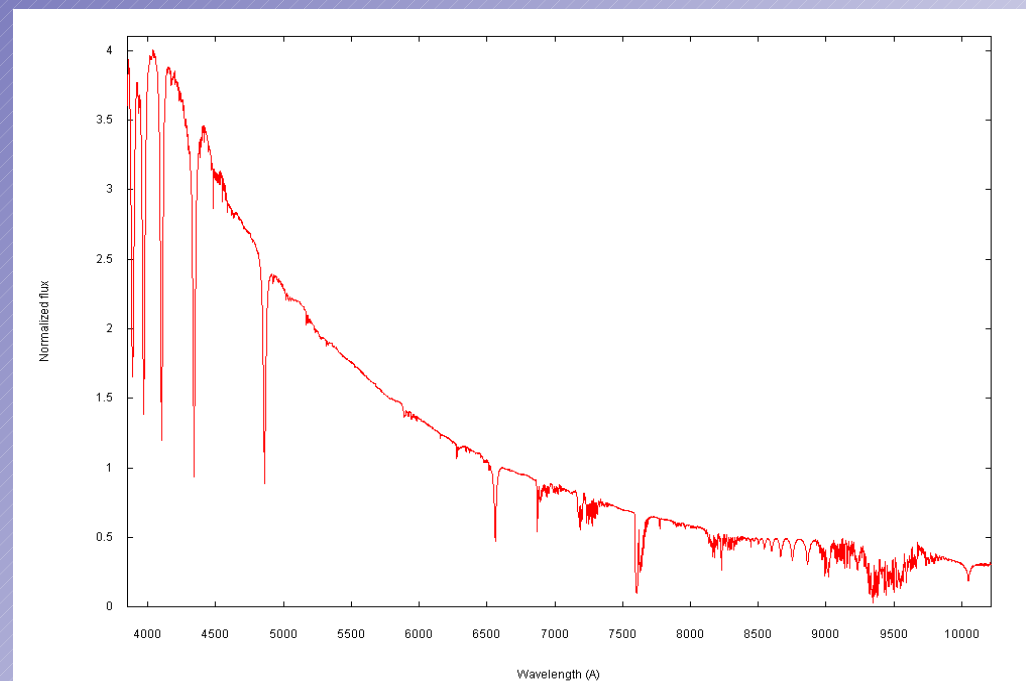
Spektrális érzékenységi görbe meghatározása

Szükséges: spektrális standard csillag spektruma

mért spektrum:

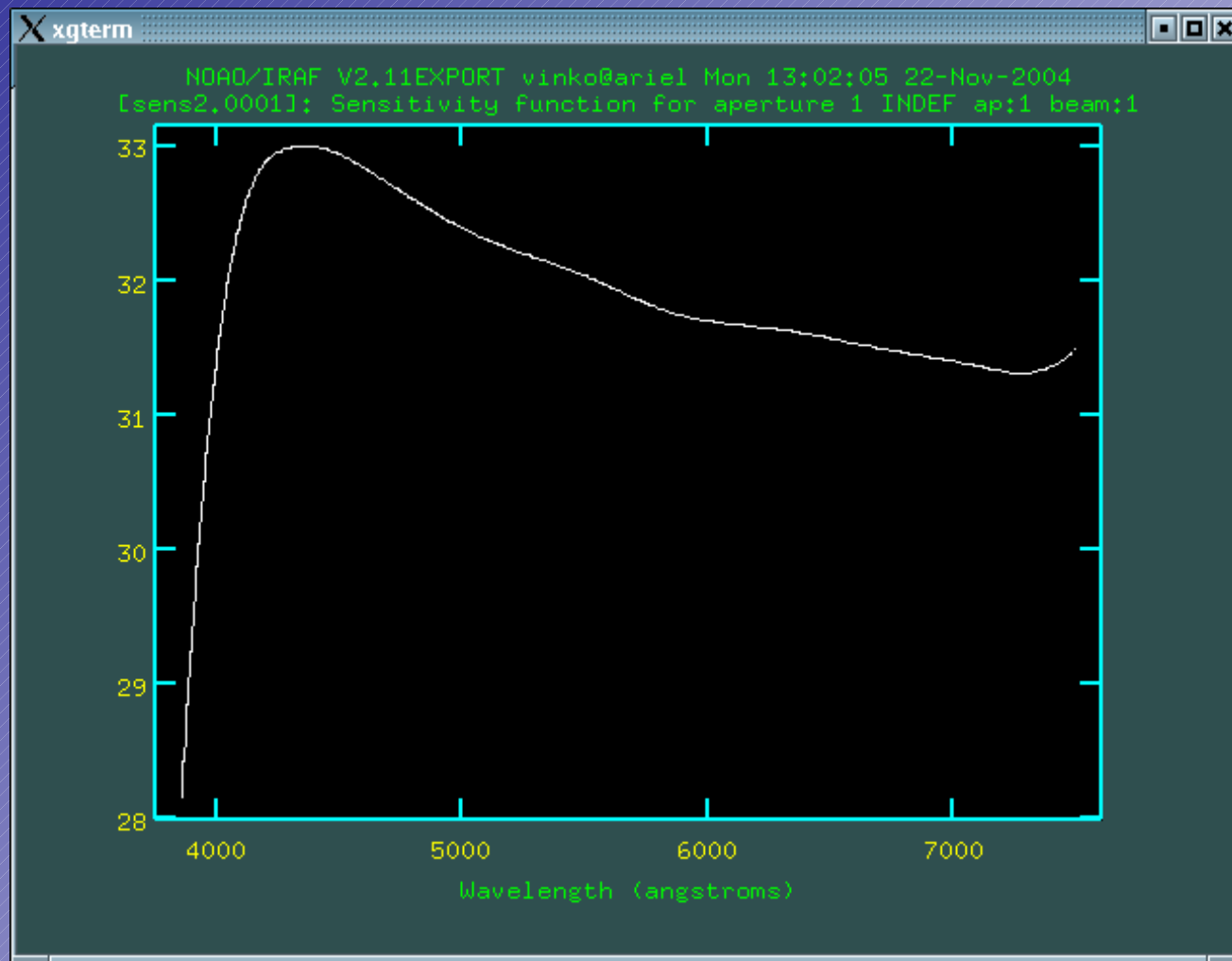


"irodalmi" spektrum: $S(\lambda)$



Spektrális érzékenységi görbe meghatározása

$$G(\lambda) = F(\lambda)/S(\lambda)$$



Spektrális érzékenységi görbe meghatározása

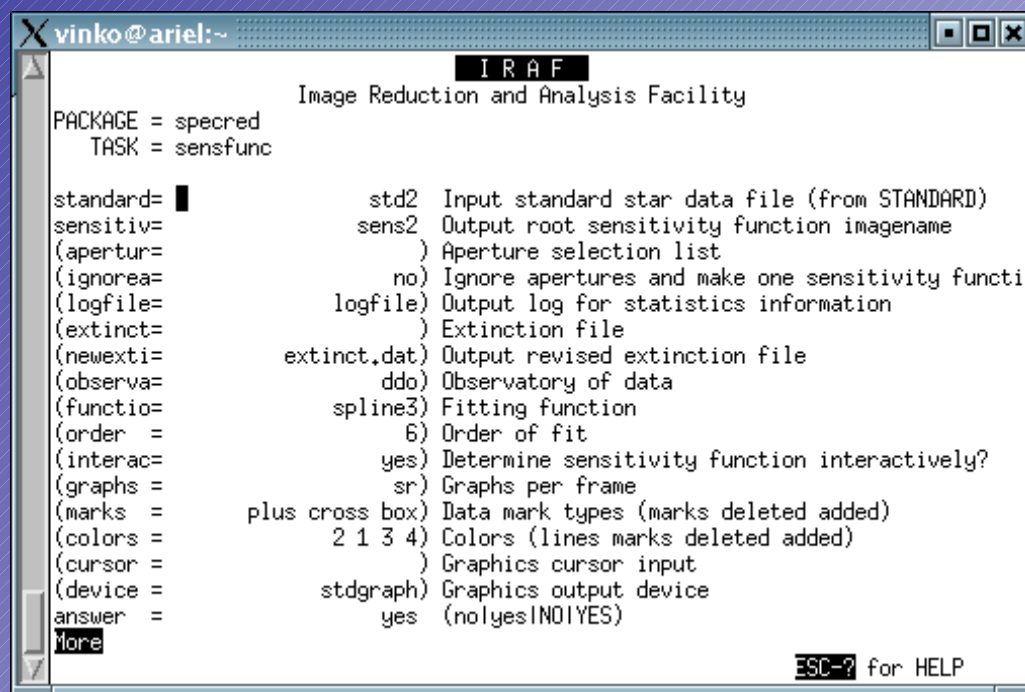
IRAF-ben: imred/speccred/standard
standard csillag mért spektrumának hozzáadása
az adatbázishoz

```
vinko@ariel:~  
IRAF  
Image Reduction and Analysis Facility  
PACKAGE = speccred  
TASK = standard  
  
input = hd74280_*.fits Input image file root name  
output = std2 Output flux file (used by SENSFUNC)  
(samesta= yes) Same star in all apertures?  
(beam_sw= no) Beam switch spectra?  
(apertur= ) Aperture selection list  
(bandwid= INDEF) Bandpass widths  
(bandsep= INDEF) Bandpass separation  
(fnuzero= 3.68000000000000E-20) Absolute flux zero point  
(extinct= ) Extinction file  
(caldir = onedstds$spec16cal/) Directory containing calibration data  
(observa= ddo) Observatory for data  
(interac= yes) Graphic interaction to define new bandpasses  
(graphic= stdgraph) Graphics output device  
(cursor = ) Graphics cursor input  
star_nam= hr3454 Star name in calibration list  
airmass =  
exptime =  
More  
ESC-? for HELP
```

```
vinko@ariel:~  
IRAF  
Image Reduction and Analysis Facility  
PACKAGE = speccred  
TASK = standard  
More  
mag = Magnitude of star  
magband = Magnitude type  
teff = Effective temperature or spectral type  
answer = n (nolyes!NO!YES!NO!YES!)  
(mode = ql)  
ESC-? for HELP
```

Spektrális érzékenységi görbe meghatározása

IRAF-ben: **imred/speccred/sensfunc**
az érzékenységi görbe meghatározása



The screenshot shows a terminal window titled 'vinko@ariel:~' with the IRAF (Image Reduction and Analysis Facility) interface. The window displays the 'sensfunc' task settings. The title bar of the window is 'vinko@ariel:~'. The main window has a title bar 'I R A F' and a subtitle 'Image Reduction and Analysis Facility'. The main content area shows the following settings:

```
PACKAGE = specred
TASK = sensfunc

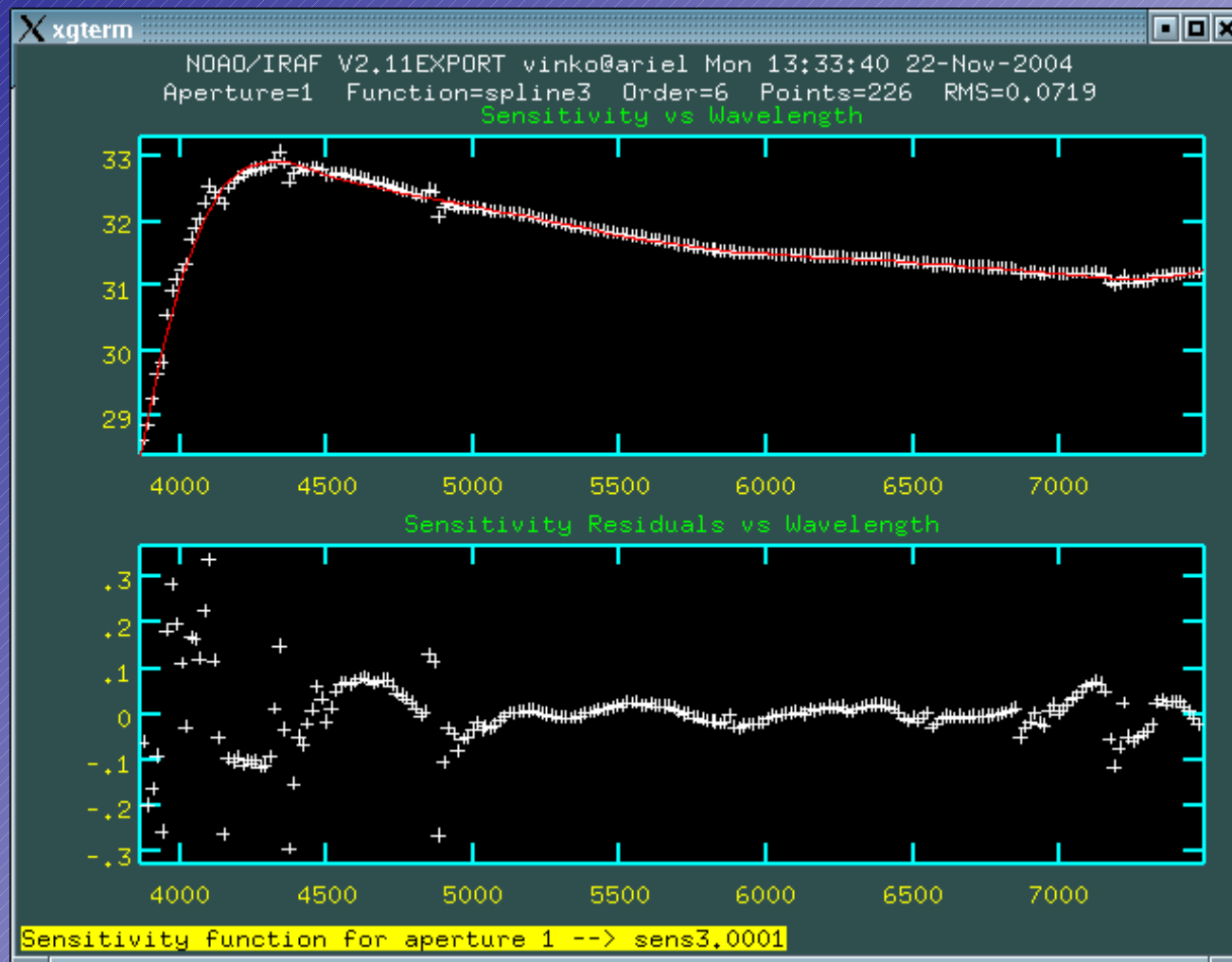
standard=
sensitiv=
(apertur=
(ignorea=
(logfile=
(extinct=
(newexti=
(observa=
(function=
(order =
(interac=
(graphs =
(marks =
(colors =
(cursor =
(device =
(answer =
More
```

The right side of the window shows the descriptions for the parameters:

```
std2 Input standard star data file (from STANDARD)
sens2 Output root sensitivity function imagename
) Aperture selection list
no) Ignore apertures and make one sensitivity functi
logfile) Output log for statistics information
) Extinction file
extinct.dat) Output revised extinction file
ddo) Observatory of data
spline3) Fitting function
6) Order of fit
yes) Determine sensitivity function interactively?
sr) Graphs per frame
plus cross box) Data mark types (marks deleted added)
2 1 3 4) Colors (lines marks deleted added)
) Graphics cursor input
stdgraph) Graphics output device
yes (no)yes|NO|YES
```

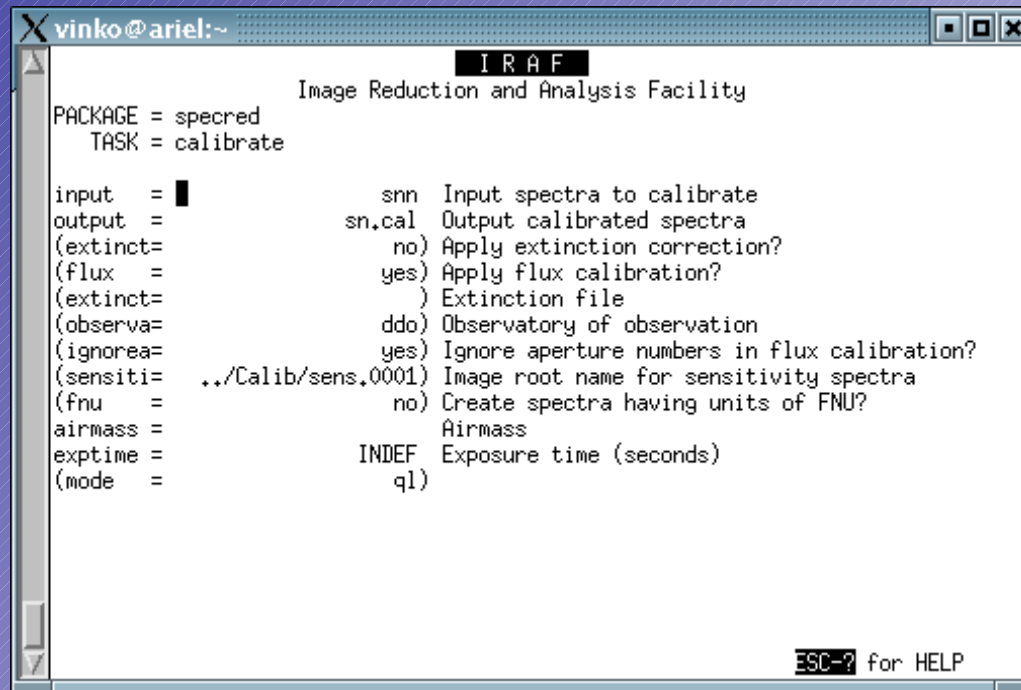
At the bottom right, there is a prompt 'ESC-? for HELP'.

Spektrális érzékenységi görbe meghatározása



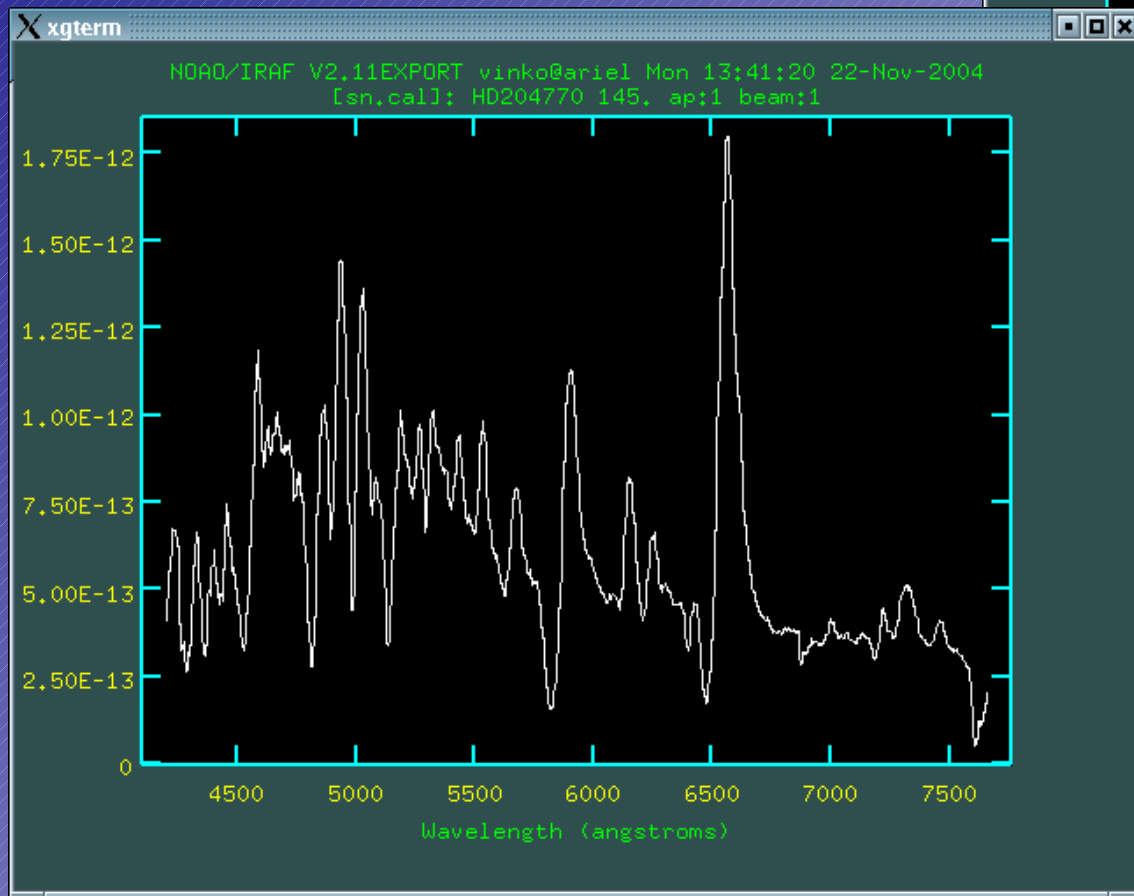
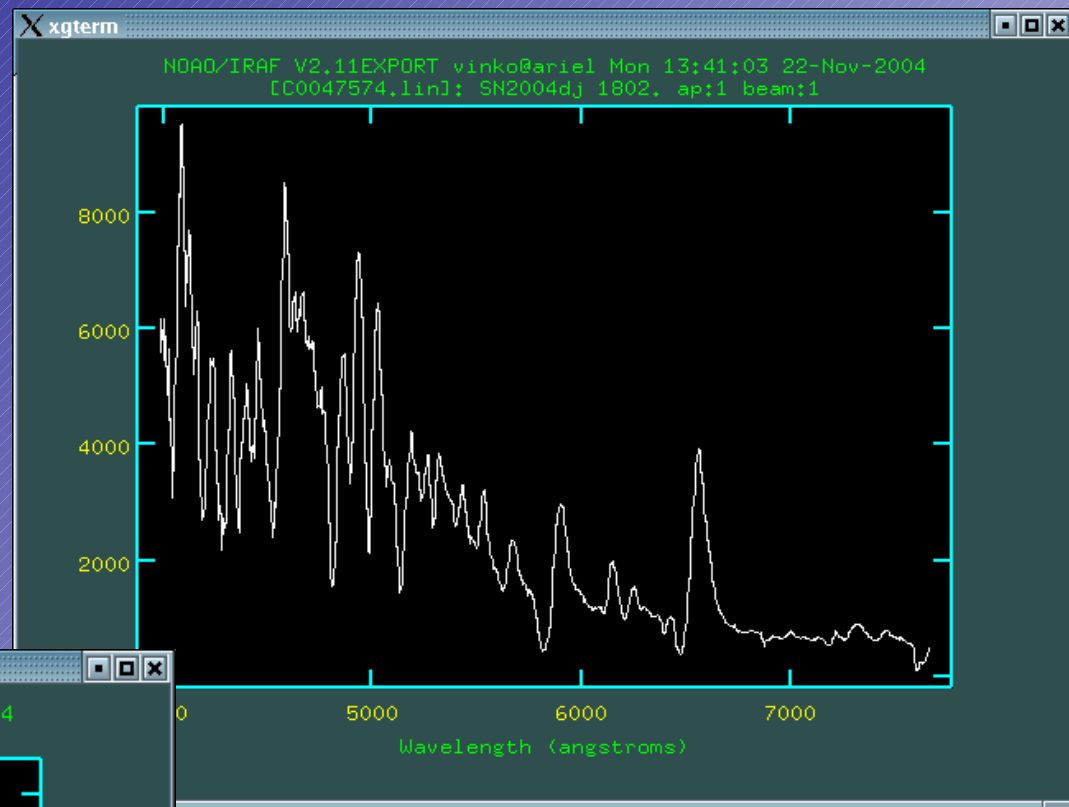
Fluxus kalibráció

imred/specrred/calibrate



```
vinko@ariel:~  
IRAF  
Image Reduction and Analysis Facility  
PACKAGE = specred  
TASK = calibrate  
  
input =           snn  Input spectra to calibrate  
output = sn.cal  Output calibrated spectra  
(extinct= no) Apply extinction correction?  
(flux = yes) Apply flux calibration?  
(extinct= ) Extinction file  
(observa= ddo) Observatory of observation  
(ignorea= yes) Ignore aperture numbers in flux calibration?  
(sensiti= ../Calib/sens.0001) Image root name for sensitivity spectra  
(fnu = no) Create spectra having units of FNU?  
airmass = Airmass  
exptime = INDEF Exposure time (seconds)  
(mode = ql)  
  
ESC-? for HELP
```

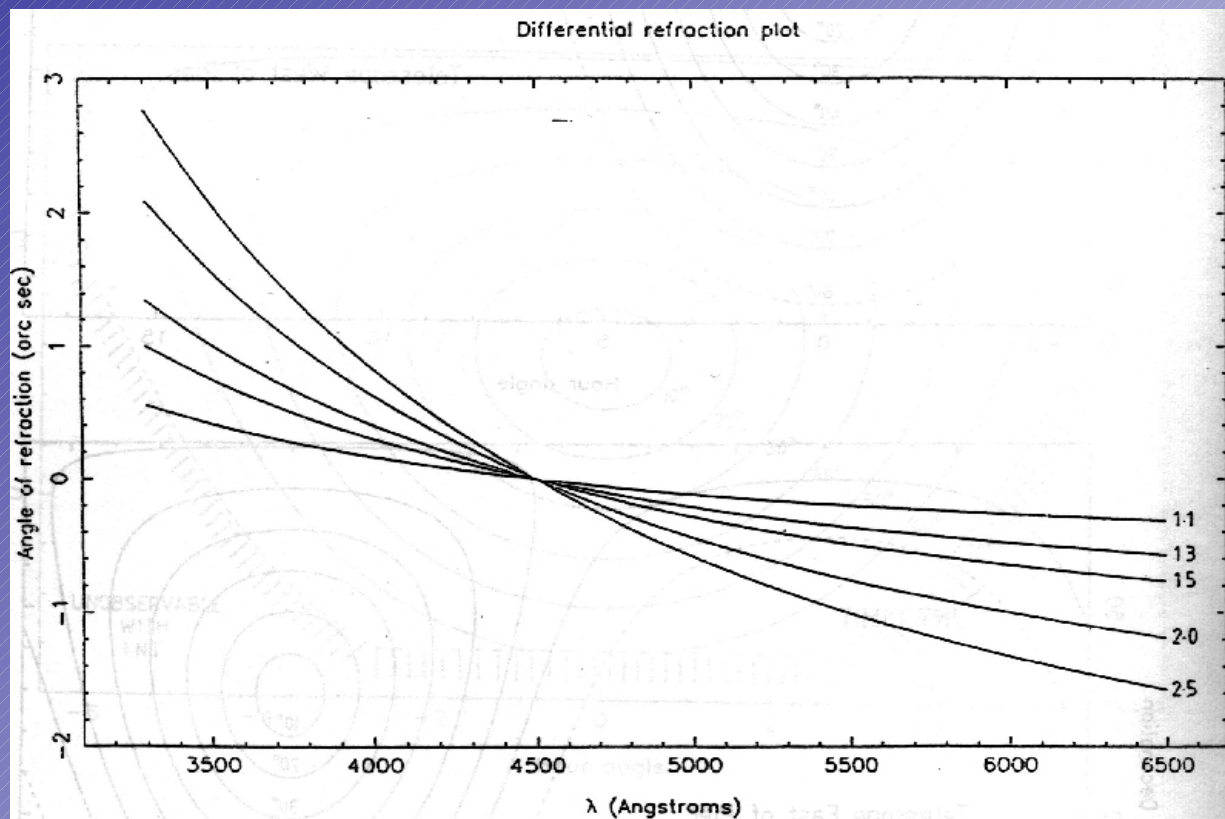
Fluxus kalibráció



Probléma: differenciális refrakció

Atmoszféra: diszperzív közeg

- pontforrás képe nem pontszerű lesz, hanem egy horizont felé mutató színes csík
- az effektus a nagyobb levegőtömegek felé nő



Probléma: differenciális refrakció

Megoldás: a spektrográf rését a horizontra merőlegesen kell irányítani

- altazimut szerelésnél: triviális
- parallaktikus szerelésnél: "parallaktikus szög"

