

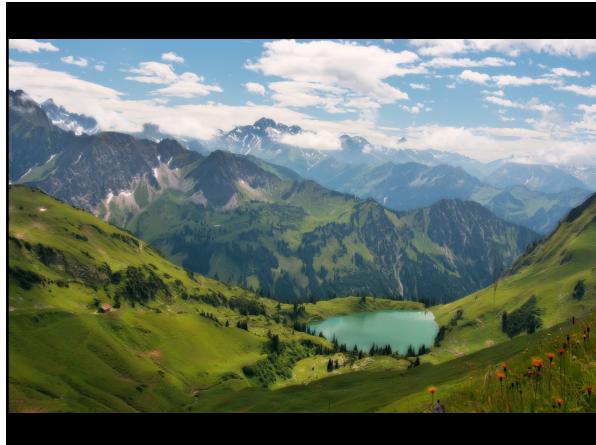
The optimizer

- ◆ Hazy 1 Chap 17
- ◆ Examples in tsuite / auto
 - ls *optim*.in

Downhill simplex

- ◆ Evaluate sum of differences between predictions and observations at every set of parameter
- ◆ Vary the parameters to minimize this sum of errors

$$\chi_i^2 = \left(\frac{F_i^m - F_i^0}{\min(F_i^m, F_i^0) \sigma} \right)^2 \quad (17.1)$$



Specify observed quantities

- ◆ Series of "optimize" commands
- ◆ Column density
 - optimize column densities
 - hydrogen 1 < 17
 - carbon 4 17.4 error =.001
 - silicon 3 14.6 // The Si+2 column density
 - end of column densities

Luminosity or intensity of normalization line

- ◆ optimize intensity -0.3
- ◆ normalize to "O 3" 5007
 - // we want a 5007 luminosity of 10^34.8 erg/s
- ◆ optimize luminosity 34.8

Line spectrum

- optimize lines
- O 3 5007 intensity =13.8 error =0.1
- Blnd 3727 < 2.1 (only upper limit)
- O 3 88.33m 1.2
- O 1 145.5m 1.6
- end of lines

Temperatures

- optimize temperature
- Hydrogen 1 36200K volume
- H2 0 150K radius
- end of temperatures

Controlling the optimizer

◆ Hazy 1 Sect 17.7

- Optimize increment = 0.4 dex
- Optimize iteration = 1000
- Optimize range -2.3 to 3.9
- Optimize tolerance 0.01