SFIT4

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Enhancements since sfit2 3.94

- Raytracing included in sfit4
- Convergence threshold switched to change in the cost function.
- Noise can be iteratively adapted.
- Thermal emission of the atmosphere can be calculated
- Levenberg Marquardt iteration scheme revised
- AVK calculation for Levenberg-Marquardt iteration scheme included
- Restructured input
- In preparation:
    - Speed dependend Voigt line shape
    - Temperature retrieval

New Input

- sfit4.ctl – hardcoded, cinput and rdrv.ctl have been merged into this
- file.spectrum – file containing the spectrum
- file.statlayers – file containing layers of retrieval
- file.refprofile – file containing reference atmosphere and a priori profiles

- Software provided to ease transition from version sfit2 3.94 to sfit4
  - Can be integrated into batch processing

Old input files

- file.eap_dat – empirical apodiziation
- file.ephs_dat – empirical phase error
- file.sa_matrix – full Sa matrix or its inverse
- file.isotope – isotope definitions
- file.solarlines – linelist of solar species
- File.linelist – cfgl files

 Old input files are the same as they were in sfit2 version 3.94.

Output

- Output filenames fix except raytracing output
  - detail
  - AK.out – AVK of target gas
  - PRFS.out – profile of target gas
  - Pbpfile
  - Statevec
  - Optional: Spec.out – Spectra by iteration
  - More optional output can easily be included

Raytracing and masspath

- lblatm wrapped into a module and included in sfit4
- "fastcode.script" now included into sfit4
- Prepared to perform temperature retrieval – this needs some study and validation.
- SZA, radius of earth for particular place of measurement has to be calculated separately and handed to sfit4
- Old "fascode" output generated and saved for future reference

Levenberg Marquardt Iteration

• Iteration scheme design to deal with moderate non-linear problems
• Tradeoff between Gauss Newton and steepest descend
• Calculation of AK matrices included (depend on iteration history)

Emission of atmosphere

• Calculates thermal emission of atmosphere
• Not negligible when using Moon as light source in the lower MCT region
• Pure emission spectroscopy is also possible.

Mini workshop to sfit4 in the afternoon

- Detailed introduction to new input format
- Conversion of single test cases
- Caveats and the general direction of work.