File Format Specification

FIT

2006-06-26

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1 Change history

Revision	Date	Author	Description
1.0	26.6.2007	Vesa Oikonen, Calle Laakkonen	New document format, based on version 2005-11-21

2 Background

Various mathematical functions, e.g. sums of exponential functions, rational functions, or polynomials, can be fitted to the measured PET data curves. The fitting of input (plasma) TACs may be required by some modelling or simulation approaches, but usually fitting is performed for the following reasons:

- Sampling is too coarse to use dot-to-dot linear interpolation/integration as input or in metabolite correction
- To reduce measurement noise
- To extrapolate curve after the last measured sample
- To estimate the maximum values and times of regional tissue TACs for pseudo-equilibrium analysis

3 List of available functions

Read information on fitting functions to plasma (or other) time-activity curves.

Function names, equations, and procedures for evaluating their values at required times, are specified in mathfunc.c, part of Turku PET Centres C libraries.

4 Format

The fit file format can contain the parameters of different functions fitted to one or more curves. The file is an ASCII text file, which starts with string "FIT", possibly followed by file format version number. The same line contains the name of the program that was used to fit the data or to otherwise produce the fit file.

The following four title lines contain the date and time of fitting, the name of the datafile which was fitted, the unit of the original data values, and the unit of sample times.

The next line specifies the number of fitted curves that follow, each one on its own line. Before those, there is a title line showing information on what the fit results on the following lines represent. They contain:

1. name and plane of fitted region (or ROI001, ROI002, etc, if original datafile does not contain region names),
2. fit start and end time,
3. sample number (number of data points included in the fit),
4. weighted sum-of-squares of fit,
5. number of function parameters (*N*)
6. specific number to identify the applied function,
7. and the parameters (p1, p2, ..., p*N*) of that function.

There are a few previous fit file formats in the Turku PET Centre, especially the one produced by FitROI program. Currently, there is no way to convert these files to the currently supported format.

5 Example: function fitted to fractions of unchanged tracer (MP4B) in plasma

```
FIT1 fit_hill 1.2 (c) 1999,2002 by Turku PET Centre
Date: 2002-04-24 14:31:24
Data file: e:\ua2826.rat
Data unit:
Time unit: min
Nr of VOIs: 1
Region Plane Start End dataNr WSS parNr Type Parameters
000001 . . 0.500 15.000 7 4.74e-03 3 0842 1.0000e+00 6.1457e-01 1.8023e-01
```