1 Program tfim

1.1 Purpose

To perform t-tests on sets of functional images.

1.2 Usage

Usage 1: **tfim [options] -set1 image_files ... -set2 image_files ...**
Usage 2: **tfim [options] -base1 bval -set2 image_files ...**

In usage 1, the collection of images files after '-set1' and the collection after '-set2' are averaged and differenced, and the difference is tested for significance with a 2 sample Student t-test.

In usage 2, the collection of image files after '-set2' is averaged and then has the constant numerical value 'bval' subtracted, and the difference is tested for significance with a 1 sample Student t-test.

> N.B.: The input images can be in the usual 'short' or 'byte' formats, or in the floating point 'flim' format.
>
> N.B.: If in either set of images, a given pixel has zero variance (i.e., is constant), then the t-test is not performed. In that pixel, the .tspm file will be zero.

1.3 Options

-prefix pname:
'pname' is used as the prefix for the output filenames. The output image files are:
pname.diff = average of set2 minus average of set1 (or minus 'bval')
pname.tspm = t-statistic of difference
Output images are in the 'flim' (floating pt. image) format, and may be converted to 16 bit shorts using the program ftosh.
*** The default 'pname' is 'tfim', if -prefix isn't used.

-pthresh pval:
'pval' is a numeric value between 0 and 1, giving the significance level (per voxel) to threshold the output with; voxels with (2-sided) t-statistic less significant than 'pval' will have their diff output zeroed.
*** The default is no threshold, if -pthresh isn't used.

-eqcorr dval:
If present, this option means to write out the file

$$\begin{aligned} \text{pname.corr} &= \text{equivalent correlation statistic} \\ &= t/\sqrt{(dof + t\hat{}2)} \end{aligned}$$

The number 'dval' is the value to use for 'dof' if dval is positive. This would typically be the total number of data images used in forming the image sets, if the image sets are from sfim or fim. If dval is zero, then dof is computed from the number of images in -set1 and -set2; if these are averages from program sfim, then dof will be smallish, which in turn means that significant corr values will be higher than you may be used to from using program fim.

*** The default is not to write, if -eqcorr isn't used.

-paired:

If present, this means that -set1 and -set2 should be compared using a paired sample t-test. This option is illegal with the -base1 option. The number of samples in the two sets of images must be equal. [This test is implemented by subtracting -set1 images from the -set2 images, then testing as in '-base1 0'.]

*** The default is to do an unpaired test, if -paired isn't used. In that case, -set1 and -set2 don't need to have the same number of images.