SPM8 (r4290) Release Notes

These Release Notes summarise the main changes that were made in the latest release of the SPM8 software, between r4010 (21 July 2010) and r4290 (04 April 2011).

Geodesic Shooting Toolbox

There is a new toolbox for image registration for doing shape analysis (*Shoot*), either with some form of voxel-wise tensor-based morphometry, or for a whole-brain multivariate deformation-based morphometry. The actual registration procedure is described in [1]. Some potential applications (multivariate DBM) are described in [2].

[1] J. Ashburner and K.J. Friston. **Diffeomorphic registration using geodesic shooting and Gauss-Newton optimisation**, NeuroImage, 55(3):954-967, 2011.
[2] J. Ashburner and S. Klöppel. **Multivariate models of inter-subject anatomical variability**, NeuroImage, In Press.

Modification of variance estimates for M/EEG, PET and VBM

Voxels which feature low effect-size and very low variance can be artefactually significant. The previous release described (under the section "Group inversion") a scheme for "lower bounding the standard error" of the t-test to force such voxels to have low significance. In this release there are two changes to this implementation:

(i) It is now modality specific, in that it is no longer used for fMRI data, since acquisition artefacts can lead to problematically high maximum standard error, and hence an overly conservative lower bound.

(ii) It is now enacted by modifying the residual mean squares image (ResMS) saved on disk. This permits F-contrasts for M/EEG data (and reduces leakage outside the brain in VBM F-contrasts with generous analysis masks). It also has the advantage that the t-statistics can be easily reproduced using the saved con_xxxx and ResMS images (though they still of course differ slightly to statistics recomputed from the original input images outside SPM).

Modification in Second Level models

As a consequence of a bug fix for the specification of the 'effects of interest' F-contrast used for non-sphericity correction, the order of columns has changed in the design matrix for some second level models (paired t-test, multiple regression, one-way ANOVA within-subject and flexible factorial designs) so that subject effects are moved towards the right-hand side. Previously defined contrasts have to be reordered to take this into account; thus, particular attention must be made for contrasts that were defined automatically in scripts or batches.

For example, see below how the change affected a "paired t-test" design matrix:
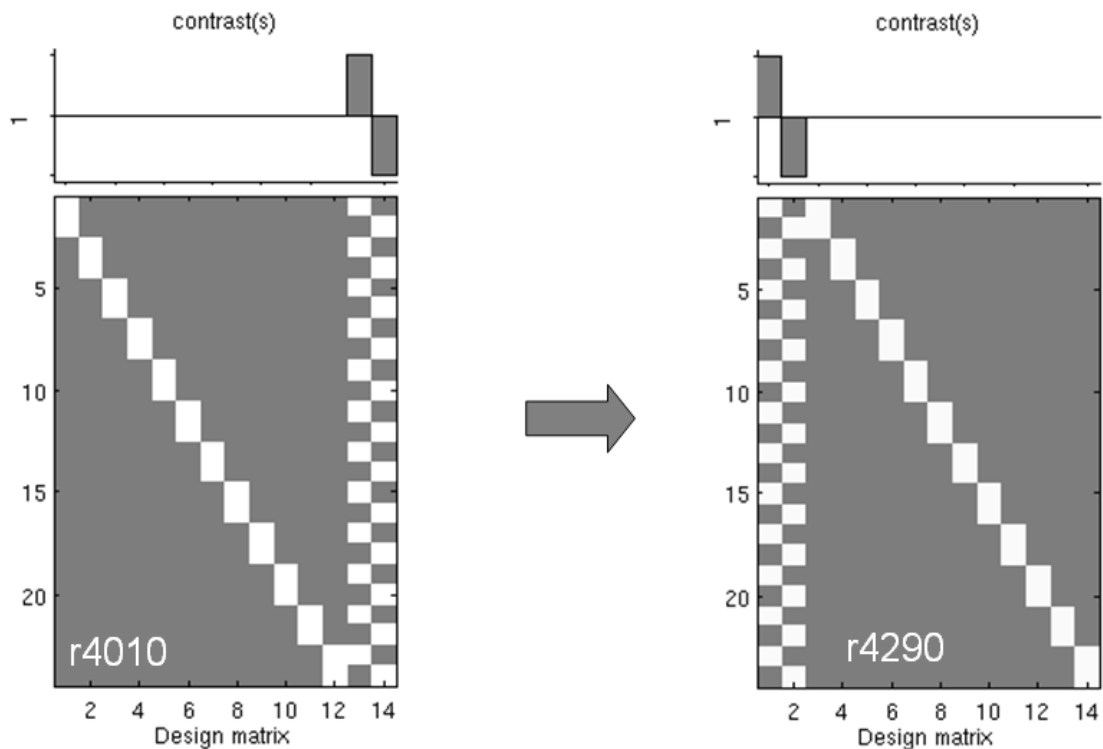
New option in FieldMap Toolbox

A new routine is available in the FieldMap Toolbox that allows voxel displacement maps to be applied directly to realigned EPI time series and can be used to perform distortion correction in any phase encoding direction.

SPM for M/EEG

If you are updating SPM8 from a previous version, it is recommended to remove the folder `fieldtrip` from the `external` directory before installing the updates. Alternatively you can download and install a full version of SPM that already contains all the updates.

Please assist us by reporting any bug you might observe to <spm@fil.ion.ucl.ac.uk>.