



HUMAN
Connectome
PROJECT

WU-Minn HCP Q3 Release:
Reference Manual

Appendix II – Matlab code for voxel-wise
correction of dMRI gradients

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Code for voxel-wise correction of dMRI gradients (from BEDPOSTX/DTIFIT)

This file is downloadable at http://humanconnectome.org/documentation/data-release/correct_bvals_bvecs.m

```
% %%%%%%%%%%%  
% Reading gradient nonlinearity file and bvals/bvecs  
% The I/O below assumes FSL installed (4.0 or higher)  
% %%%%%%%%%%%  
  
% Read gradient nonlinearity file  
addpath([getenv('FSLDIR') '/etc/matlab'])  
filename = 'grad_dev.nii.gz';  
g = read_avw(filename);  
  
% Read bvals and bvecs text files  
bvecs = load('bvecs'); % should be 3xN  
bvals = load('bvals'); % should be 1xN  
  
% %%%%%%%%%%%  
% Actual correction starts here  
% The following code corrects bvecs and bvals  
% for a given voxel (i,j,k)  
% %%%%%%%%%%%  
% create matrices  
L = reshape(squeeze(g(i,j,k,:)),3,3);  
I = eye(3);  
  
% correct bvecs and calculate their norm  
v = (I+L)*bvecs;  
n = sqrt(sum(v.^2));  
  
% Normalise corrected bvecs and correct bvals  
new_bvecs = v./repmat(n,3,1) ;  
new_bvals = n.^2.*bvals;
```