*HI*GHLY *SP*ECIFIC BUT *E*DGILY *E*FFECTIVE *D*ATA-PROCESSING (HI-SPEED) SOFTWARE PACKETS

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INTRODUCTION

HI-SPEED is …

It is a Java-based software. It contains MATLAB, IDL and MATHEMATICA interfaces from which you can call the Java software packet in HI-SPEED (pun intended).

It is freely available upon request.

It can be easily incorporated into other participating software packages in the Weekend Educational Course of the ISMRM 17th Scientific Meeting and Exhibition, Honolulu, Hawai'i, April 18, 2009.

Some HI-SPEED packets such as Constrained/Ordinary Nonlinear Least Squares Diffusion Tensor Estimation [1] and PIESNO [2] are already in TORTOISE [3].

It is an going software development project. More packets will be added as needed.

HI-SPEED is not …

It is not your one-stop software.

It is not GUI-based.

It is not what you imagine it to be if you fantasize about everything the software can do.

CAPABILITIES

1. Constrained Nonlinear, Ordinary Nonlinear, Weighted Linear, Ordinary (Unweighted) Least Squares Diffusion Tensor Estimations [1].

2. Probabilistic Identification and Estimation of Noise (PIESNO) [2], see E-POSTER 4691.

3. Uncertainty Assessment: Analytical Error Propagation of scalar, vector and tensor quantities of the diffusion tensor [4].

3. Elliptical Cone of Uncertainty of the eigenvectors of the diffusion tensor and its normalized measures [5].

4. Two-dimensional and Three-dimensional Analytical MRI (Shepp-Logan) phantom in both the Fourier domain and image domain [6].

6. SNR Analysis of MR Signals [7].

7. Signal-transformational Framework for breaking the noise floor [8], see E-POSTER 4692.

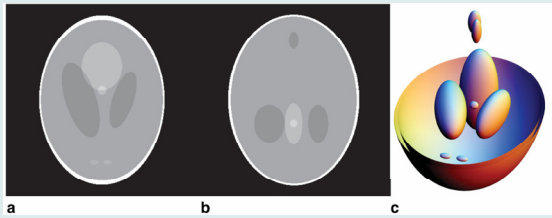

Figure 1. Analytical 3D Shepp-Logan Phantom in both the Fourier domain and image domian for MRI.

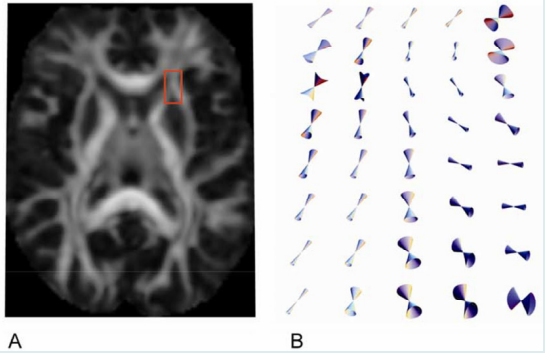

Figure 2. Elliptical cones of uncertainty of the major eigevector of the diffusion tensor.

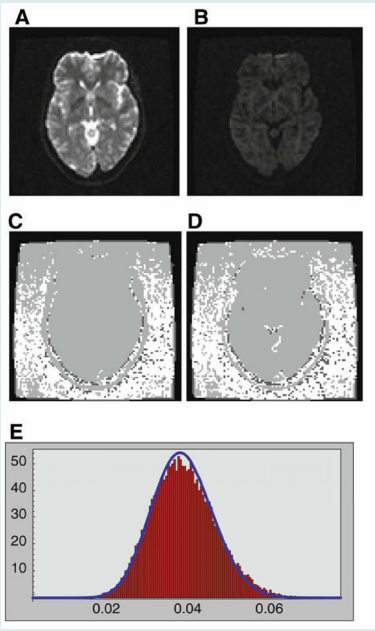

Figure 3. Identification of noise-only pixels and estimation of Gaussian Noise via PIESNO.

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*For software request, please send email to C.G. Koay at guankoac@mail.nih.gov. Information about the software can be found at http://sites.google.com/site/hispeedpackets/