BE280A, Principles of Biomedical Imaging 11/22/05
Fall Quarter 2005

BE280A Final Project Assignment

Due Date: Completed project is due on Thursday, December 8, 2005 at 11 a.m. in my office at the Center for fMRI.

Guidelines:

1) You are encouraged to work with a partner, although you may also work alone. Please send me an e-mail with the subject heading *BE280A Project Group* by 11/28 indicating whether you will work in a group (indicate partner's name) or on your own. Discussion of ideas is encouraged between groups, however, each report submitted should reflect each group's own understanding of the material.

2) Format: The project description should be in the format of a short scientific paper with sections described below. Use a word-processing program to write the report, including all equations (no handwritten reports!). Neatness and clarity of exposition will play a significant role in the grading of the report. Other grading criteria include technical correctness and originality.

Project Description
In this project you will investigate an MRI parallel imaging method, known as PILS that is described in the paper *Partially Parallel Imaging with Localized Sensitivities (PILS)* by Griswold et al. 2000. A copy of this paper is posted on the course website. In addition, a review paper that discusses PILS is available on the website. If you have a very strong systems background and would like a more challenging method to work on (e.g. the SENSE or GRAPPA paper mentioned in the review paper), please contact the instructor. Your goal is to provide a concise summary of the PILS method and to recreate some of the results in the paper. In particular, you are asked to generate simulation results similar to those shown in Figure 5 of the paper.

Your report should contain the following sections:
1. Introduction: Provide an overview of the method and why it is useful.
2. Theory: Provide a description of the theory behind the method, using the mathematical notation that we have used in this class.
3. Methods: Provide a description of the simulations, including details such as how you constructed the simulation phantom, the matrix size you used in the simulation, your assumptions about FOV and coil sensitivity, how you sampled k-space in your simulations, etc.
4. Results: Present and describe your simulations results, comparing and contrasting them to Figure 5 of the PILS paper.
5. Discussion: Comment on your findings. Did they differ significantly from those in the paper? What are the relative advantages and disadvantages of the PILS method. Can you think of any improvements that could be made to the method?
6. References: List any references you used in preparing your report. In-text citations of references should follow author-year format (e.g. Griswold et al 2000).
7. Appendix: Include a print-out of your MATLAB code and also send an electronic version to the instructor via e-mail (the subject line should read ***BE280A PILS project***). The MATLAB script you send should have the form *pils_[initials].m*. Typing the command *pils_[initials].m* should run all necessary simulations and generate the plots in your report.
8. Acknowledgments: If you discussed the project with students outside of your group, please indicate the extent and nature of the discussions – e.g. talked about theory with so and so