**A Guide to the Matlab Optimization Functions**

**File=opt-guide.pdf**

Pages 1 & 2: See general optimization problem classification.

Page 6: Minimization problems including unconstr. opt. and binary problems.

Page 6: Basic multi-objective optimization problems including min-max.

Page 6: Linear and non-linear equations in 1 and several variables

Page 7: Least-Squares problems

**File=constr-nonlin-opt-examples.pdf**

Pages 1-3: Provide a nice example with nonlinear constraints and bounds.

**Page 4: Adding gradients. Note how to define the functions in Steps 1 & 2.**

**Page 6: Note how to specify a Hessian using the Lagrange multipliers.**

Page 12: Note that specifying a Hessian sparsity property is done using:

options = optimset('GradObj','on','HessPattern',Hstr);

where the Hstr is defined in the example.

Page 19: Shows an example of how to generate the Hessian using the symbolic

toolbox.

**Files=optimset.pdf, optimset-fun-ex.pdf**

You can initialize everything using Matlab’s optimset. This includes initializing the Hessian, it’s sparsity, the trust-region radius, the maximum number of function evaluations, parallel runs, etc.

**Directory=Statistics-toolbox-LS-Regression**

**File=lasso-example.pdf**

Page 3, bottom gives the equation of the optimization problem solved by Lasso.

Page 4, for “Elastic Net”, we have the basic definition of what is being fitted.

Notice that the algorithm is provided as an alternative to Least-Squares in that it can find fits with zero predictor coefficients. In Matlab, it produces several fits allowing you to examine the variability in the parameters. A nice example is given on page 5. To set the parameters, you can read the