

## MTH 654/659 Fall 2011. Final Assignment

### **Instructions:**

Solve Problem 1 and one of 2,3.

When reporting on your computational experiments, provide a concise summary of what you have observed/determined. [Do not just staple a bunch of graphs and papers together].

### **Problems**

1. Solve an elliptic BVP on a region corresponding to your personal letter. Use  $f$  and boundary conditions as discussed in class. (Please send me an image in .jpg or .pdf that came out of this).
2. Reconsider problem # 3 from previous assignment; now with  $u(x, y) = x(t(y))^2$  and  $K$  given as in iii), iv). How does your answer change ?
3. Implement the simple residual a-posteriori error estimator (and/or Bank-Weiser estimator) for the singularly perturbed problem  $-\epsilon u'' + u = 1, u(0) = 0 = u(1)$  (problem # 5 from Assignment 1). Demonstrate how it can be used to adapt the grid. Compute the efficiency index for that problem.