

## Homework 13 , Neural net

Part A and B done. Sorry about not doing C.

### Part A

Output files: OutA.png shows the function estimate and the target, OutA.txt merely tells what the cost function was before and after optimization.

I use 8 neurons to estimate the target function, I show the result in a plot where I show both the training points and the estimate, it is certainly not perfect, but it is somewhat close.

Note, after some experimentation, I chose to use the quasi newtonian method, as the downhill simplex did not converge as well.

As other people suggested my starting guess is with the  $a_i$  parameters spread evenly over the interval of the function while the other parameters are set to 1, this makes the convergence significantly faster.

### Part B

Output files: OutB.png shows the function estimate and the target, OutB.txt merely tells what the cost function was before and after optimization.

I interpret the exercise like this: instead of specifically training the function having 3 outputs, with 3 different weights ( $f(x)$ ,  $f'(x)$  and  $F(x)$ ), I use three different activation functions: the gaussian wavelet, the derivative of the gaussian wavelet and its anti-derivative, the weights and parameters used in the sum is the same, but the different activation functions should give the derivative an anti-derivative.

I get reasonable agreement with the true derivatives and anti-derivatives, not perfect, but I think this should count as working.