

Name: _____

ChBE 2120, Numerical Methods, Paravastu Section, Fall 2015

Quiz 4: 20 points possible

1) (12.5 points) Setup a matrix problem that could be used to solve the Boundary Value Problem below, describing a counter-current heat exchanger. To approximate the derivatives, use the following finite difference formula: $f'(x) \cong \frac{f(x_{i+1}) - f(x_i)}{h}$. Use a step size, $h = 10$.

$$\frac{dT_2}{dx} = 2(T_1 - T_2), T_2(0) = 55$$

$$\frac{dT_1}{dx} = 1.5(T_1 - T_2), T_1(30) = 25$$

2) (7.5 points) Using the functions defined in the headers below, write Matlab code to solve Problem (1) using the Shooting Method.

Function Header 1: `function [Tprime] = InitianValueODE(x, T)`

Function Header 2: `function [tSolution, Ysolution] = ODERungeKutta4(Yprime, tRange, Y0, h)`
`%Y = [T2; T1]`

Function Header 3: `function [xRoot] = SecantMethod(x0, x1, f, EaMax)`