CVEN 302
Computer Applications in Engineering and Construction
Problem Set #12 Boundary Value Problems

Date distributed : 11.30.2009
Date due : 12.4.2009 at 11:30 a.m.

Return your solution either in class or in my mail box (8th Floor, CE/TTI) by the date shown above. Please show all your work and follow the rules outlined in the course syllabus.

1 Reading

Read Chapter 22 in Chapra (2008). Write the finite difference numerical solution to the river contaminant transport equation given by

\[ D \frac{d^2c}{dx^2} - u \frac{dc}{dx} - kc = 0 \] (1)

where the constant coefficients are \(D\), the diffusion coefficient, \(u\), the river velocity, and \(k\), the bacterial die-off rate. Use a first-order forward difference for the first-order derivative and a second-order central difference for the second-order derivative.

2 Book Problems

Work problems 22.4 (by hand) and 22.10 in Chapra (2008). Be sure to work out the numerical solution to 22.10 before coding the solution in Matlab.

A References
