

CHE560-HW # 8 (Due: Wed. 4-June, 2008)

Consider the hyperbolic PDE representing blood dialysis in problem 10.4 in your textbook. Perform the following:

- (a) Put the PDE, IC and BC's in dimensionless form.
- (b) Using explicit-Euler integration for axial coordinate and Chebyshev collocation for radial coordinate, discretize the PDE and write the resulting system of algebraic equations.
- (c) Use the sample program provided to you to solve the resulting equations in (b). Plot the dimensionless concentration as a function of the axial and radial coordinates and demonstrate the convergence of your numerical solution.
- (d) Repeat (b) and (c) using implicit-Euler for the axial coordinate.

CHE560-HW # 9 (Due: Wed. 4-June, 2008)

Consider the elliptic PDE representing two dimensional conduction in cylindrical coordinates, see equations 1.79-180 of your textbook:

- (e) Put the PDE and BC's in dimensionless form.
- (f) Using Chebyshev collocation for radial and axial coordinates, discretize the PDE and write the resulting system of algebraic equations.
- (g) Use the sample program provided to you to solve the resulting equations in (b). Plot the dimensionless temperature as a function of the axial and radial coordinates and demonstrate the convergence of your numerical solution.