

# CEE 618 – Scientific Parallel Computing: Homework #3

Name: \_\_\_\_\_

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1. (50 pts) In the class example problem (page 5), derive the concentration profile  $C(x, y)$  if the fourth boundary condition is replaced by

$$C(x = L, y) = 20 \sin\left(\frac{2\pi y}{L}\right) \quad (1)$$

Use the method of separation of variables.

2. (optional 25 pts) Calculate eigen values and vectors of

$$\begin{pmatrix} 2 & 3 & 0 \\ 3 & 2 & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad (2)$$

(a) by hand and (b) using LAPACK. To run an executable file, make a PBS script and use `qsub`.

3. (50 pts) Calculate the inverse matrix of

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & 1 & 4 \\ 5 & 6 & 0 \end{pmatrix} \quad (3)$$

using LAPACK subroutines (a) `dgetrf + dgetrs`, and (b) `dgetrf + dgetri`. To run an executable file, make a PBS script and use `qsub`.