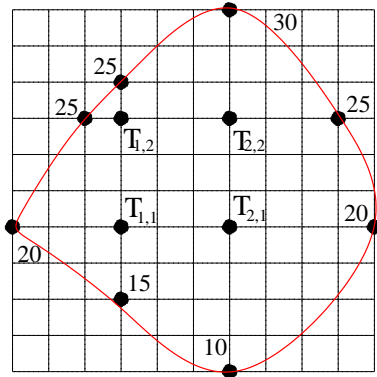


ENGR 8102: COMPUTATIONAL ENGINEERING

Problem Set 2 (due in class on Monday, 10/26)

Questions:

1. (7 pts.) Write down the four coupled linear equations for the following system. Then rewrite them in matrix form ($Ax = b$), where x is a vector of temperature variables, b is vector of scalars, and A is a matrix of scalars. Find the values of T_{11} , T_{12} , T_{21} and T_{22} by solving this system ($x = A^{-1}b$).



2. (7 pts.) Modify the code `gs_insulated.m` given in class, to feature an 20x20 grid (including boundaries), for the case of constant $60^{\circ}C$, $40^{\circ}C$ and $XX^{\circ}C$ temperatures on the top, right and bottom; and insulated boundary on the left. Here, XX is the last two non-zero digits of your uga-ID. Plot the temperature distribution and isothermal lines (run enough iterations so that there is no visible error). Include a copy of your code and the graphs along with your solution. Submit soft copy to caner@uga.edu.
3. (7 pts.) Modify the code `gs_flow.m` given in class, to feature an 20x20 grid (including boundaries), for the case of constant $XX^{\circ}C$ and $20^{\circ}C$ temperatures on the top and bottom; and a heat flow $Q_x = 8$ entering the system from left boundary and exiting the system from right boundary (Let $h=1$). Here, XX is the last two non-zero digits of your uga-ID. Plot the temperature distribution and isothermal lines (run enough iterations so that there is no visible error). Include a copy of your code and the graphs along with your solution. Submit soft copy to caner@uga.edu.