Project 2 CEGE 4352,

Note

Part I.1

Program a single cylindrical lake with constant and given potential in a field of uniform flow. Write the program in MATLAB and produce a flow net. The cylinder is to be placed at any point z_1 and has radius R_1. Produce contour plots for flow at an arbitrary angle of your choice. Choose a given value for the potential at some point z_0 far away from the lake(s).

Part I.2

Modify your program to add a second cylinder. The second cylinder is centered at an arbitrary point z_2 and has radius R_2. Model the second cylinder by using only a single term in the expansion in addition to the logarithmic term. Determine the constants in your solution such that you obtain the best solution, i.e., a solution for which the potential along each cylinder wall is as close to the given value as possible. Choose the two values of the constants α_1 and α_1, Q_{01} and Q_{02} for your first estimate such that the boundary condition would be met exactly along each cylinder wall, if the other one would not be present. Investigate how the solution becomes less accurate as the cylinders are moved closer together. Show your results in the form of flow nets.

Part II

Part II.1

Program the expansions for the two cylinders such that the potential has the proper value along each lake boundary.

Deliverables

The source code of the program you wrote, including a description of the functions and an outline of the structure of the program. A brief report on your work in pdf form with the code in pdf form attached.