

**FINITE-DIFFERENCE OPERATORS-- ITERATION METHODOLOGY****Introduction**

Read pages 19-28 in Wang and Anderson (1982). Using a text-processing program or the DOS-EDITOR, type in the code listed on page 30 (Wang and Anderson, 1982). Compile your program using the F77 on UNIX or the window Fortran compiler on the computers in the Hydrology Computing Lab, Verify that the output is the same as that in Wang and Anderson (1982).

Once you have the code running properly, modify the FORTRAN to print NUMIT and AMAX to a File that can be read by EXCEL or GRAPHER for displaying the changes in residuals between successive iterations.

Once you have made these changes, run the program three times. Once each using a convergence criterion of 0.1, 0.01, and 0.001 feet. Using the output files from these three runs, plot NUMIT versus AMAX for each of the three runs. Label them appropriately. Answer the questions below.

**Questions**

- (1). What conclusions can you make regarding the time of computation versus the value of the convergence criterion?
- (2). What types of field information should be used to determine whether a flow model adequately represents reality?
- (3). This program, in its present form, does not allow fluxes to be computed. In a steady-state solution does the value of K affect computed water levels? Does it affect the flux in the flow system?
- (4). Why is it necessary to have more than just water-level data to assure that a steady-state flow?