HW#10

Assigned: Tuesday, November 3, 2009

Due: Tuesday, November 17, 2009

Write the finite difference formulation for the 1-D problem. For the pressure equation, collect terms for $\Delta_t P_i$, $\Delta_t P_{i+1}$, and $\Delta_t P_{i-1}$, with all other terms on the right-hand side (R_P). For the saturation equation, assume $P_o^{[n+1]}$ is known. Collect terms for $\Delta_t S_{w,i}$, $\Delta_t S_{w,i+\frac{1}{2}}$, $\Delta_t S_{w,i+1}$, $\Delta_t S_{w,i-\frac{1}{2}}$, and $\Delta_t S_{w,i-1}$, with all other terms on the right hand side (R_S). Please note that you will need the 2-D formulation for the term project.

a) Write the final form of the pressure equation in terms of $\Delta_t P$. Start with the answer from HW#8a or HW #9.
b) Write out the saturation expansion for the IMPES formulation in terms of $\Delta_t S_w$. (project option 1)
c) Write out the saturation expansion for the partially implicit formulation. (project option 2)