

SOIL 6583 – Soil Physics Theory
Homework 5

1. Complete the Matlab script “diffusivityHW.m” by correctly filling in the four missing lines of code. Turn in a hard copy of the completed script and the two figures it generates.
2. Complete the Matlab script “deVriesHW.m” by correctly filling in the one missing line of code. Turn in a hard copy of the completed script with the thermal conductivity of the saturated sand written on it by hand in units of $W\ m^{-1}\ ^\circ C^{-1}$.
3. Write a Matlab script that works Example 5.8, problem 5.4, and problem 5.5 from the textbook. Turn in a hard copy of the script and the output (figures and command window output) it produces.
 - a. For example 5.8, the script should insert in each figure the corresponding estimate of the soil thermal diffusivity ($m^2\ s^{-1}$). You can hard code the data from Table 5.9 into the script.
 - b. For problem 5.4, the script should calculate the thermal conductivity in $W\ m^{-1}\ ^\circ C^{-1}$, the volumetric heat capacity in $J\ m^{-3}\ ^\circ C^{-1}$, and the thermal diffusivity in $m^2\ s^{-1}$. The thermal properties should be calculated at volumetric water contents of [0, 0.05, 0.15, 0.25, 0.35, 0.50]. Results can be displayed in the command window, no figure is necessary.
 - c. For problem 5.5(b), the script should use temperatures of [20, 30, 40, 50, and 60] degrees Celsius. Results can be displayed in the command window, no figure is necessary.