HWRS 505: Vadose Zone Hydrology

Lecture 21

11/9/2023

Today:

Parameter estimation/Inverse modeling using HYDRUS-1D

Review of Lecture 20

The concept of inverse modeling and examples using the steady-state spreadsheet model

1. Inverse modeling
    - Inverse modeling vs. forward modeling
    - The complications of inverse modeling (e.g., various errors and uniqueness of solution)
2. Steady-state spreadsheet model
    - Impact of measurement errors on parameter estimation

Inverse modeling using HYDRUS-1D

Exercise 1

Finish the example used in Ty's L13a HYDRUS-inverse tutorial.

Exercise 2

Similar to Exercise 1, but instead of estimating Ks, estimate n and Ks. You can use the following initial guesses. n=2, Ks = 1.5 cm/hour.

Exercise 3

Similar to Exercise 2, but only estimate n, i.e., Ks is given. Use the same initial guess n=2.

True values for the parameters. n=1.56, Ks=1.04.