Homework Assignment 4

A furrow irrigation system has been evaluated. The critical input parameters are: \( S_0 = 0.008; \ T_{\text{max}} = 34 \text{ cm}; \ L = 340 \text{ m}; \ T_{\text{mid}} = 28 \text{ cm}; \ \text{Base} = 12 \text{ cm}; \) and \( Y_{\text{max}} = 13 \text{ cm}. \) A cylinder infiltrometer was used to measure the Kostiakov-Lewis parameters with the result that: \( a = 0.379; \ k = 0.0084 \text{ m/min}^a; \) and \( f_0 = 0.00015 \text{ m/min}. \) Soil moisture samples were taken which indicated that \( Z_{\text{req}} = 10 \text{ cm}. \)

1. If the inlet discharge, \( Q_o, \) was 2 lps, how long will it take for the advance to reach 60, 100, 140, 200, 250, and 340 m?
2. What is \( \tau_{\text{req}}? \)
3. What are the values of \( \rho_1, \rho_2, \sigma_1, \sigma_2, \gamma_1, \gamma_2? \)
4. If the flow is 2.4 lps, \( t_L \) is 168 min, \( t_{0.5L} \) is 52 min, and \( f_o \) is the same, what are the values of \( a \) and \( k? \)
5. What was the Distribution Uniformity?
6. What was the Application Efficiency?