The Homework1 of Environmental Biophysics

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Question: Please derive the calculation fromula of D with soil temperature observation at two depths.

$D = \frac{z_1 - z_2}{\ln(T_{z2} - T_{ave}) - \ln(T_{z1} - T_{ave})}$

Answer: $T = T_{ave} \pm A(0)exp(-z/D)$

$\Rightarrow \frac{-z}{D} = \ln \frac{T - T_{ave}}{\pm A(0)}$

$\Rightarrow \frac{-z_1}{D} - \frac{-z_2}{D} = \ln \frac{T_1 - T_{ave}}{\pm A(0)} - \ln \frac{T_2 - T_{ave}}{\pm A(0)}$

$\Rightarrow \frac{-z_1 + z_2}{D} = \ln \frac{T - T_{ave}}{T_2 - T_{ave}}$

$\Rightarrow D = \frac{z_1 - z_2}{\ln(T_{z2} - T_{ave}) - \ln(T_{z1} - T_{ave})}$