

Name: _____

418 Quiz 1

Consider the non-uniform transport equation

$$u_t + e^{-x}u_x = 0$$

1. Find and plot some characteristic curves of the PDE.
2. Find the form of the general solution.
3. Predict the long term behavior of the initial condition $u(0, x) = \frac{1}{1+x^2}$ given your characteristic equations.
4. Find the solution to the IVP. Plot it using Desmos or another dynamic plotter to examine the behavior as t changes.
5. What is the domain of your solution?

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