You need to change the variables:
\[
\begin{align*}
\xi &= x - ct \\
\tau &= t.
\end{align*}
\]


Then see \( U(\xi, \tau) \) satisfies which equation: \textbf{which formula we need to use?}

\textbf{Oh Chain rule!}

\[
\begin{align*}
\frac{\partial u}{\partial t} &= U_\xi \frac{\partial \xi}{\partial t} + U_\tau \frac{\partial \tau}{\partial t} \\
\frac{\partial u}{\partial x} &= U_\xi \frac{\partial \xi}{\partial x} + U_\tau \frac{\partial \tau}{\partial x}
\end{align*}
\]

So

\[ U_\tau = -\lambda U. \]

Where this \( U(\xi, \tau) \) comes from? You forget? You’re kidding me?

So, \( U(\xi, \tau) = h(\xi)e^{\lambda \xi} \). (Have trouble to solve for \( U \)? see the reference on solving linear ODE in this page.)