$$\frac{\partial u}{\partial t} = -c\frac{\partial u}{\partial x} + c\frac{\partial^2 u}{\partial x^2}\frac{(\Delta x)}{2!}(1\text{-CFL})$$

Assume solution is summation of terms like $(A_k e^{jkx})e^{\alpha t}$

$$\alpha(A_k e^{jkx})e^{\alpha t} = -cjk(A_k e^{jkx})e^{\alpha t} + c(jk)^2(A_k e^{jkx})e^{\alpha t}\frac{(\Delta x)}{2!}(1 - CFL)$$

Error in Lecture (at 18:50 mark): Missing "t" (Hat tip to Hussein Mariner for this catch)

$$\alpha = -cjk - ck^2\frac{(\Delta x)}{2!}(1 - CFL)$$

$$u(x,t) = A_k e^{jk(x-ct)}e^{-(1-CFL)(ck^2)\Delta x t/2}$$