Recap

- Separable solutions to linear PDEs of the form

$$\eta \dot{u} + \rho \ddot{u} = -Ju + Ku'' , \qquad (3.2.30)$$

  are closely related to normal modes of the Laplacian operator, and can take the form

$$u(x,t) \propto e^{i\omega(k)t} \sin(kx + \theta) , \qquad (3.2.31)$$

  with $\omega(k)$ given by the dispersion relation, as solution to

$$i\omega\eta - \omega^2 \rho + Ju = -Kk^2 . \qquad (3.2.32)$$

- In a finite system, the allowed values of k are determined by boundary conditions. For example, with closed boundary conditions $u(0,t) = u(L,t) = 0$, $k_n = n\pi/L$ for $n = 1, 2, 3, \cdots$.