

$$\Rightarrow u_{xx} = \frac{(N^2 M_{xx} - M N N_{xx} - 2 N M_x N_x + 2 M N_x^2)}{N^3}$$

$$\text{Let } p = 20\beta\pi, \quad q = -0\pi^2, \quad r = \beta.$$

$$\Rightarrow M_t = p q e^{qt} \sin(\pi x)$$

$$N_t = r q e^{qt} \cos(\pi x)$$

$$M_x = p \pi e^{qt} \cos(\pi x)$$

$$N_x = -r \pi e^{qt} \sin(\pi x) = -\frac{M}{20}$$

$$M_{xx} = -p \pi^2 e^{qt} \sin(\pi x)$$

$$N_{xx} = -r \pi^2 e^{qt} \cos(\pi x)$$