

$$2 - 2\lambda^2 + 2\lambda^2 \cos(k\Delta x)$$

$$2\lambda^2 - 2\lambda^2 \cos(k\Delta x) \leq 4$$

$$2\lambda^2(1 - \cos(k\Delta x)) \leq 4$$

$$2\lambda^2(2\sin^2(\frac{k\Delta x}{2})) < 4$$

$$4\lambda^2(\sin^2(\frac{k\Delta x}{2})) < 4$$

$$\Rightarrow 4\lambda^2 < 4$$

$$\lambda^2 \leq \frac{4}{4}$$

$$\lambda \leq \sqrt{1}$$

$$\lambda \leq 1$$