

EXAMPLE

OFFSPRING DISTRIBUTION:

$$\alpha = \left(\frac{1}{5}, \frac{2}{5}, \frac{2}{5}, 0, \dots, 0 \right)$$

WHAT IS PROB. OF EXTINCTION?

$$\mu = \frac{1}{5} \cdot 0 + \frac{2}{5} \cdot 1 + \frac{2}{5} \cdot 2 = \frac{6}{5} > 1$$

SUPERCRITICAL

$$G_x(s) = E_x(s^x) = \frac{1}{5}s^0 + \frac{2}{5}s^1 + \frac{2}{5}s^2$$

$$\underline{\underline{G_x(s) = s:}} \quad \frac{1}{5} + \frac{2}{5}s + \frac{2}{5}s^2 = s$$

$$2s^2 - 3s + 1 = 0$$

$$G_x(1) = \sum_{k=0}^{\infty} P(X=k) = 1$$

$$(s-1)(2s-1) = 0$$

$$2s - 1 = 0$$

$$\boxed{\text{EXTINCTION PROB. : } \frac{1}{2}} \quad \underline{\underline{s = \frac{1}{2}}}$$