

Termination of process:

(Weights for 1st trial: z_1
Analytical problem when n jumps for P_n)

Name X_n No. of particles in generation n , $1, 2, 3, \dots$
 ~~X_n~~ Prob. of termination at or before
set in the generation: $X_n = 0$

$$X_n = P_n(0)$$

$$X_0 = 1 \\ X_1 = p_0$$

x_n increases with n
(does not decrease)

$$P(s) = p_0 + p_1 s + p_2 s^2 + \dots + p_n s^n$$

$$s = 0$$

$$P(0) = p_0 = x_1$$

$$\text{when } P_n(0) = x_n$$

$$x_1 = P_0 = p_0$$

$$x_{n+1} = P(P_n(0)) = P(x_n)$$

$$x_2 = P(x_1) > P(0) = x_1$$

$$x_{n+1} = P(x_n) > P(x_{n-1}) = x_n$$

$$x_n \rightarrow \xi \quad n \rightarrow \infty$$

$$P(\xi) = \xi, \quad \xi = \xi_{\min}$$

η : other root

$$x_1 = P(0) < P(\eta) = \eta$$

$$\text{if } x_n < \eta$$

$$\text{then } x_{n+1} = P(x_n) < P(\eta) = \eta$$

$$\xi \leq \eta$$

$s=1$ is always a root

$$s_1, s_2 : \frac{P(s_1) - P(s_2)}{s_1 - s_2} = 1$$

$$P'(0) = 1 \quad s_1 < 0 < s_2$$

$$P'(1) > 1 \quad \text{with } P'(0) = 1 \text{ for } 0 < 1$$

$P'(1) = \sum k p_k$ expected number
of direct descendants