

Geometric Distribution

Starnes et al.

pp. 404 - 409

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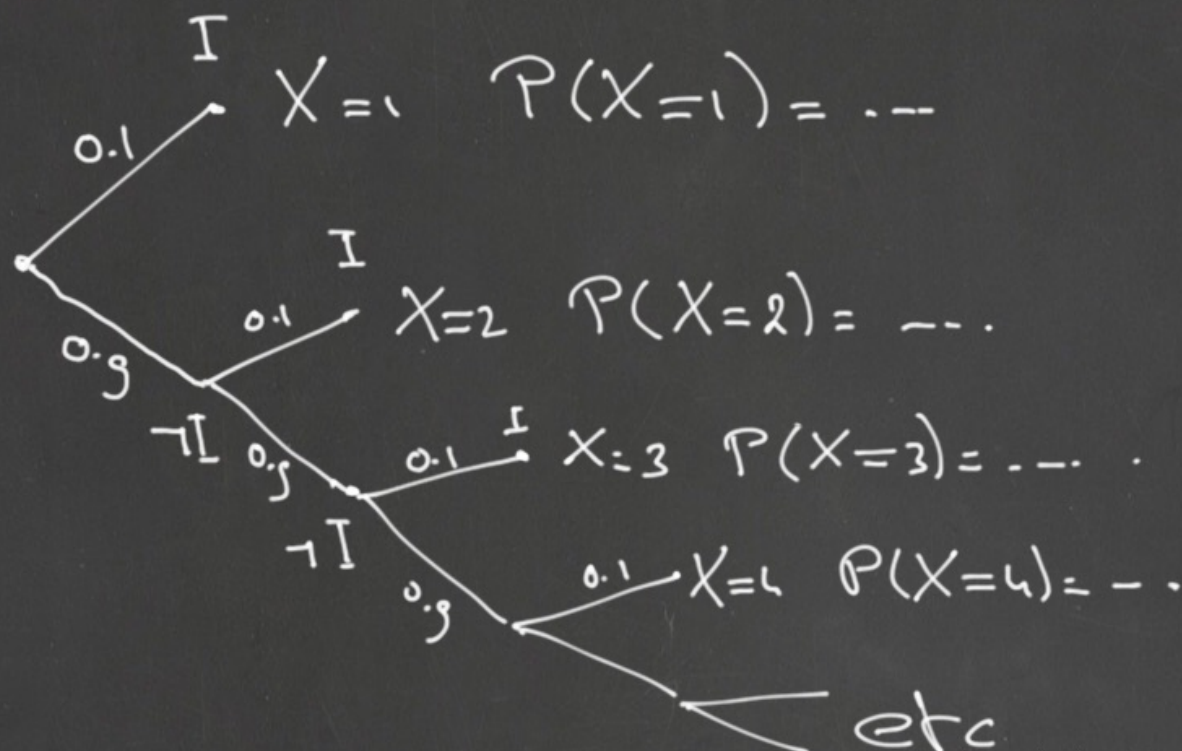
Example

- 10% of a population is infected
- exp.: testing randomly chosen persons until the first infected
- X : number of persons tested

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Tree Diagram



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$$X \sim \text{geom}(p=0.1)$$

$$P(X=1) = 0.1$$

$$P(X=2) = 0.9 \times 0.1$$

$$P(X=3) = 0.9^2 \times 0.1$$

$$P(X=4) = 0.9^3 \times 0.1$$

$$\vdots$$

$$P(X=10) = 0.9^9 \times 0.1$$

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In general

$$X \sim \text{geom}(p)$$

$$P(X = x) = (1-p)^{x-1} \cdot p$$

Without proof:

$$E(X) = \frac{1}{p}$$

$$\text{VAR}(X) = \frac{1-p}{p^2} \quad (\text{not in Starnes})$$

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Geometric settings

See p. 410, bullet 4

Exercises 6-ss

6-g6

6-gg

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