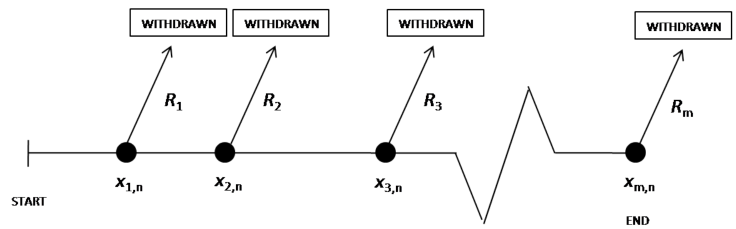
Progressive censoring with incremental binomial removals



$$R_i \sim \text{Binomial}\left(n - m - \sum_{j=1}^{i-1} R_j, \frac{i}{m}\right)$$

Joint PDF of R

$$P(\mathbf{R}) = P(R_m, R_{m-1}, \ldots, R_2, R_1) \quad (1)$$

$$= P(R_m | R_{m-1} = r_{m-1}, \ldots, R_1 = r_1) P(R_{m-1} | R_{m-2} = r_{m-2}, \ldots, R_1 = r_1) \ldots P(R_2 | R_1 = r_1) P(R_1 = r_1) \quad (2)$$

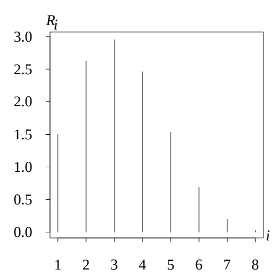


Figure 1: Expected removal scheme for $n = 20, m = 8$.

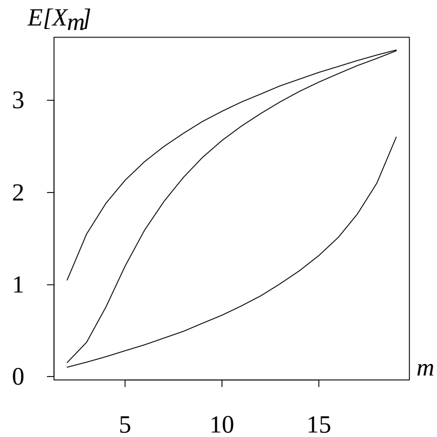


Figure 2: Expected test time for increasing m when $n = 20$ with upper and lower bounds.

Expected Test Time

$$E[X_m] = E_R[E[X_m|R]]$$
$$= \sum_{r_1=0}^{g(r_1)} \sum_{r_2=0}^{g(r_2)} \cdots \sum_{r_1=0}^{g(r_1)} P(\mathbf{R}) E[X_m|R]$$

where $g(r_i) = n - m - r_1 - \ldots - r_{i-1}$.