

Solution for exercise 2.1.2 in Pitman

We define the events Gi : i girls in family. The probabilities $P(Gi)$ is given by the binomial distribution due to the assumptions that the probabilities that each child is a girl do not change with the number or sexes of previous children.

$$P(Gi) = \binom{4}{i} \frac{1}{2}^i \frac{1}{2}^{4-i}, \quad P(G2) = 6 \cdot \frac{1}{16} = \frac{3}{8}$$
$$P(G2^c) = 1 - P(G2) = \frac{5}{8}$$