

$$P(E_1) - P(E_1|\bar{E}_2) \leq 1 - P(\bar{E}_2)$$

$$P(E_1) + P(\bar{E}_2) - P(E_1|\bar{E}_2) \leq 1$$

$$P(E_1) + P(\bar{E}_2) - \frac{P(E_1, \bar{E}_2)}{P(\bar{E}_2)} \leq 1$$

$$P(E_1) + P(\bar{E}_2) - \frac{P(E_1, \bar{E}_2)}{P(\bar{E}_2)} \leq P(E_1) + P(\bar{E}_2) - P(E_1, \bar{E}_2) \leq P(E_1 + \bar{E}_2) \leq 1$$