Conditional Event Probability

1   Why

2   Definition

Consider two events, the second of which has non-zero proba-
bility. The *conditional probability* of the first event *conditioned*
on a second event is the result of dividing the probability of the
second event into the probability of the intersection of the two
events.

2.1   Notation

Let $\mathbf{P}$ be the event probability function. Let A and B be two
events with $\mathbf{P}(B) \neq 0$. Then the conditional probability of A
conditioned on B is

$$\frac{\mathbf{P}(A \cap B)}{\mathbf{P}(B)}.$$

We denote this by $\mathbf{P}(A \mid B)$.