Conditional probabilities in a continuous model

Sunday, April 12, 2020 2:14 AM

Sample space is unit square: $\Omega = [0,1]^2$

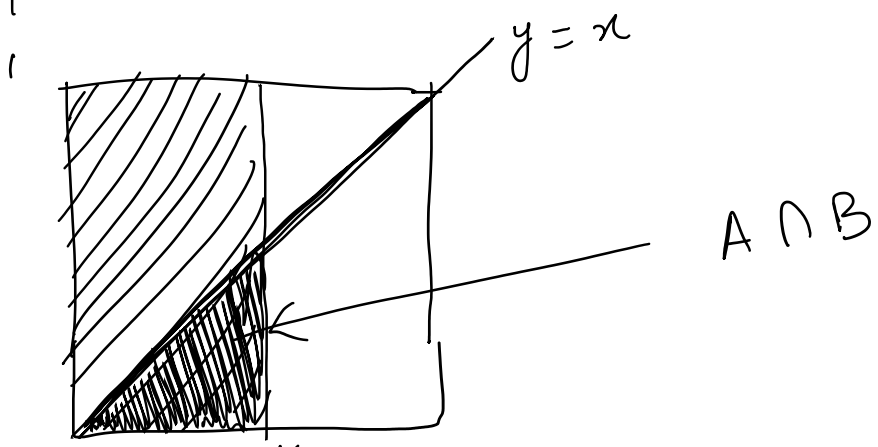
Probability of a set is it's area.

$A: (x,y) \in [0,1]^2, \; y \le x$

$B: x \le 1/2$

Find $P(A|B)$

Our plot looks like this:



$$P(B) = \frac{1}{2}$$

$$P(A \cap B) = \frac{1}{2} b \cdot h = \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$$

$$P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{1/8}{1/2} = \frac{1}{4}$$