

Trying to recreate Buffon's needle experiment with a small simulation just to get an understanding of the concepts.

Let's create a grid



lets take $l=2$ and $t=3$

Number of crossings = 6

Total number of needles = 12

$p(x)$ or probability of needle crossing is $\frac{6}{12} = \frac{1}{2} = 0.5$

θ which is the angle between needle and intersecting strip will help determine vertical distance of needle's tip from strip. With our example, it would be

$$x = \frac{l}{2} \sin(\theta) = \frac{2}{2} \sin(30) \quad // \text{assume } \theta = 30 \text{ or } \frac{\pi}{6}$$

$$= 0.5$$

so probability $p(x, \theta) = 0.5 \times 0.5 = 0.25$

Calculating π with this formula.

$$\pi = \frac{2l}{tP} = \frac{2 \times 2}{3 \times 0.25} = \frac{4}{0.75} = 5.3$$

We need lot of simulations to get right value with this method.