

This thesis contains detailed derivation of results of several generalizations of the Buffon needle problem. Next to the original problem we study grids composed of rectangles, known as Buffon-Laplace needle problem, then grids composed of parallelograms, triangles or hexagons. The application of this problem is briefly shown on the estimation of π , additional references are mentioned. We provide a proof of the theorem computing the area of a polygon, if the Cartesian coordinates of its vertices are known. Finally, we show how to solve grids composed of several different shapes, this is demonstrated on the grid composed of a regular hexagon and a diamond.