Algorithm for calculating the moment of inertia of polygonal forms

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Introduction

In statics it is known if a figure is stable under the force of gravity if its center of gravity or centroid is over the points of support of the figure.
But in dynamics it is known how large the rotational speed of a figure can be based on what is known as its moment of inertia.
The moment of inertia is calculated for a 2D figure based on calculations with respect to the x-axis or the y-axis.
The following formula is used to calculate the moment of inertia with respect to the x-axis.

$$Ix=\rho\int y^2 dA$$

Done ρ represents the specific weight of the material, i.e. the ratio of weight per unit area.

To calculate the moment of inertia with respect to the ye-axis use this other formula.

$$Iy=\rho\int x^2 dA$$

The moment of inertia is often calculated assuming a specific weight of 1 for mathematical simplicity, but from the point of view of physics this is not accurate.

Of course these calculations involve applying integrals to curves that define the geometric figure being studied.
when the geometric figure corresponds to a polygon, what can be done is to divide the area into triangles to obtain the moment of inertia corresponding to each triangle and then add the partial moments of inertia to obtain a total moment of inertia.

Moments of inertia in a basic triangle

For the triangle in the following figure where the vertices that limit it are (0,0), (x1,Y1), (x2,Y2)

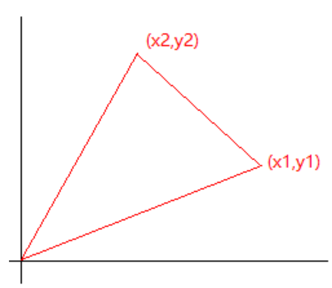

Fig 1

If you want to start from known figures, this generic triangle can be divided into four figures, three with positive areas and one with negative area.