

三角形外心的求法

给定 $\text{dot1}(\text{dot1.x}, \text{dot1.y})$ $\text{dot2}(\text{dot2.x}, \text{dot2.y})$ $\text{dot3}(\text{dot3.x}, \text{dot3.y})$

求外心(x,y)

我们根据圆心到顶点的距离相等,可以列出以下方程

$$(\text{dot1.x}-x)^2+(\text{dot1.y}-y)^2=(\text{dot2.x}-x)^2+(\text{dot2.y}-y)^2=(\text{dot3.x}-x)^2+(\text{dot3.y}-y)^2$$

化简得

$$2*(\text{dot2.x}-\text{dot1.x})*x+2*(\text{dot2.y}-\text{dot1.y})*y==\text{dot1.x}^2+\text{dot1.y}^2-\text{dot2.x}^2-\text{dot2.y}^2$$

$$2*(\text{dot3.x}-\text{dot2.x})*x+2*(\text{dot3.y}-\text{dot2.y})*y==\text{dot3.x}^2+\text{dot3.y}^2-\text{dot2.x}^2-\text{dot2.y}^2$$

令

$$A1=2*(\text{dot2.x}-\text{dot1.x})$$

$$B1=2*(\text{dot2.y}-\text{dot1.y})$$

$$C1=\text{dot2.x}^2+\text{dot2.y}^2-\text{dot1.x}^2-\text{dot1.y}^2$$

$$A2=2*(\text{dot3.x}-\text{dot2.x})$$

$$B2=2*(\text{dot3.y}-\text{dot2.y})$$

$$C2=\text{dot3.x}^2+\text{dot3.y}^2-\text{dot2.x}^2-\text{dot2.y}^2$$

即

$$A1*x+B1*y=C1$$

$$A2*x+B2*y=C2$$

根据克拉默法则

$$x = \frac{(C1 \times B2) - (C2 \times B1)}{(A1 \times B2) - (A2 \times B1)}$$

$$y = \frac{(A1 \times C2) - (A2 \times C1)}{(A1 \times B2) - (A2 \times B1)}$$