

Partial Quadrance to a Line

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Given $p = \text{point}(x \ y)$ and $l = \text{line}(c \ a \ b)$, the partial quadrance, pq , of p to l is

$$\text{pq}(p \ l) \equiv \text{vec}(1 \ x \ y) \cdot \text{vec } l = c + ax + by$$

Consequently,

$$\text{pq}(p \ l) = \text{pq}(l \ p)$$

As expressed by Wildberger, the quadrance from p to l is

$$\frac{(c + ax + by)^2}{a^2 + b^2}$$

In terms of the quadrance and partial quadrance then, the quadrance from p to l may be expressed

$$\frac{\text{q } \text{pq}(p \ l)}{\text{q } \text{vec}(l_2 \ l_3)}$$

where the quadrance of an integer n is

$$\text{q } n \equiv nn$$

Line l is amid¹ two points p_1 and p_2 if and only if

$$\text{pq}(l \ p_1) = -\text{pq}(l \ p_2)$$

¹See also the separate article “Line Amid Two Points”