least squares line fitting:

$$sx := w.x + sx$$
$$sy := w.y + sy$$
$$\{ sds := w.(y^2 - x^2) + sds \}$$
$$sxy := w.x.y + sxy$$
$$sw := w + sw$$
$$sxx := w.x^2 + sxx$$
$$syy := w.y^2 + syy$$

$x_0 = sx/sw$, $y_0 = sy/sw$ — centre of mass

$sds = syy - sxx$

$a = sds + (sx + sy).(sx - sy)/sw$

$b = 2\left(\frac{sx.sy}{sw} - sxy\right)$

$c = \sqrt{a^2 + b^2}$

$d = a/c$

$e = b/c$

$f = \sqrt{\frac{1}{2}(1 + |d|)}$

$g = e/(2f)$

$\cos\theta =$ if $d > 0$ then f else g fi

$\sin\theta =$ if $d > 0$ then g else f fi

} fit minimising perp. distance

$$\text{slope} = \frac{sw.sxy - sx.sy}{sw.sxx - sx^2}$$

fit minimising error in y