Cranktrain offset

TDC

$s_\alpha$

Cylinder axis

Side displacement

$y$

Piston pin offset

$l$

$\beta$

$\alpha$

$r$

Cranktrain with offset:

$$s_\alpha = \sqrt{(r+l)^2 - y^2} - r \cdot \cos\alpha - l \cdot \cos\beta$$

$$r \cdot \sin\alpha = y + l \cdot \sin\beta$$