Cranktrain offset

Cylinder axis

TDC

s_α

l

Piston pin offset

Side displacement

y

β

α

r

Cranktrain with offset:

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

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