

Section 2: Moments of forces at an angle

Exercise level 3

1. A uniform rod AB of length $4L$ and weight W is inclined at an angle θ to the horizontal. Its lower end A rests on a fixed support and the rod is held in equilibrium by a string attached to the rod at a point C which is $3L$ from A . The reaction of the support on the rod acts in a direction α to AC and the string is inclined at an angle β to CA . Show that
$$\cot \alpha = 3 \tan \theta + 2 \cot \beta.$$

Given that $\theta = 30^\circ$ and $\beta = 45^\circ$, show that $\alpha = 15^\circ$.

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