20-R-WE-DK-3

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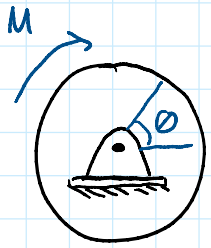
20-R-WE-DK-3 Beginner Work of a Couple Moment

Inspiration: 18-9 Hibbeler



If a couple moment ***M = (theta^2 + 2theta + 2)Nm*** is applied to a disk, determine the work of the couple moment after the disk has rotated ***4 times***. What would be the sign of the work if the moment was applied in the opposite direction?

$$dU = M \cdot d\theta \qquad U = \int M d\theta$$

$$U = \int_0^{4(2\pi)} \theta^2 + 2\theta + 2 \, d\theta = \left[\frac{1}{3}\theta^3 + \theta^2 + 2\theta\right]_0^{8\pi} = 5973.658 \text{ J}$$

If the moment were applied in the opposite direction, the work done would still be positive