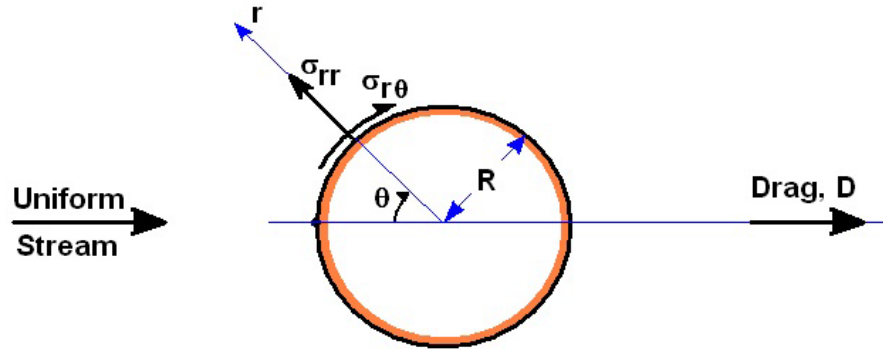


Problem 145A

Consider an idealized flow of a uniform stream around a cylinder of radius, R :



If the normal stress, σ_{rr} , and the tangential stress, $\sigma_{r\theta}$, acting on the surface of the cylinder vary with angular location, θ , according to:

$$\sigma_{rr} = -A \cos 2\theta - B \cos \theta$$

$$\sigma_{r\theta} = C \sin \theta$$

where A , B , and C are known constants, find an expression for the drag, D , acting on the cylinder per unit depth normal to the sketch. The drag is always defined as the component of force acting on a body in the direction of the oncoming stream.

What is the form drag?

What is the skin friction drag?