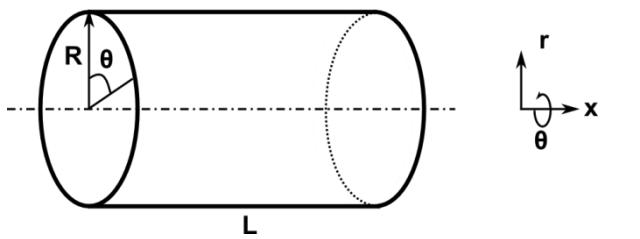


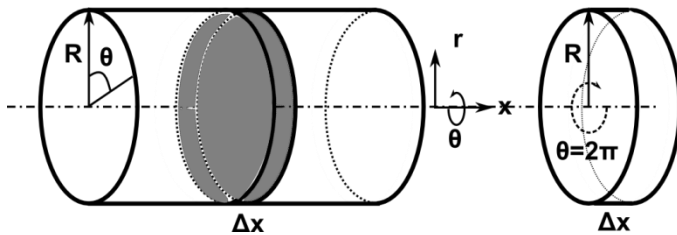
II. CYLINDRICAL COORDINATES



$$A_x = \pi R^2 \quad A_r = 2\pi RL \quad A_\theta = RL$$

$$V = \pi R^2 L$$

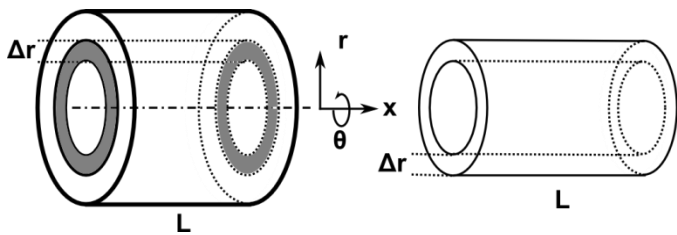
II.A. DIFFERENTIAL VOLUME ELEMENT OF Δx ($\Delta x, R, 2\pi$)



$$A_x = \pi R^2 \quad A_r = 2\pi R \Delta x \quad A_\theta = R \Delta x$$

$$V = \pi R^2 \Delta x$$

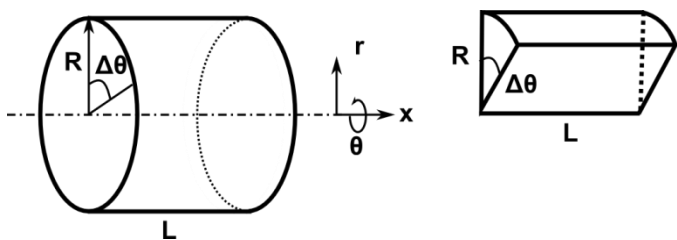
II.B. DIFFERENTIAL VOLUME ELEMENT OF Δr ($\Delta r, L, 2\pi$)



$$A_x = 2\pi r \Delta r \quad A_r = 2\pi r L \quad A_\theta = \Delta r L$$

$$V = 2\pi r \Delta r L$$

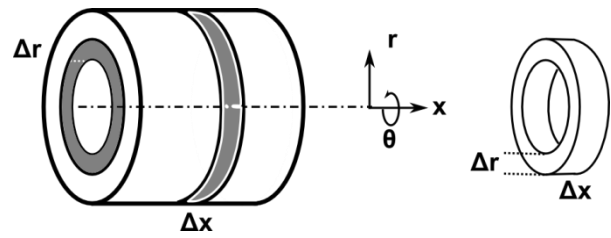
II.C. DIFFERENTIAL VOLUME ELEMENT OF $\Delta \theta$ ($R, L, \Delta \theta$)



$$A_x = \frac{R^2}{2} \Delta \theta \quad A_r = R \Delta \theta L \quad A_\theta = RL$$

$$V = \frac{R^2}{2} \Delta \theta L$$

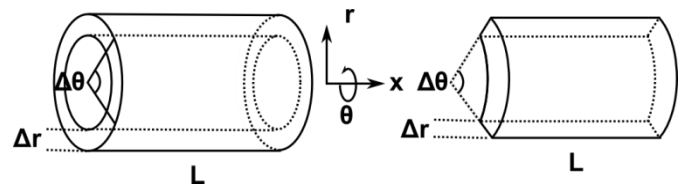
II.D. DIFFERENTIAL VOLUME ELEMENT OF $\Delta r, \Delta x$ ($\Delta r, \Delta x, 2\pi$)



$$A_x = 2\pi r \Delta r \quad A_r = 2\pi r \Delta x \quad A_\theta = \Delta r \Delta x$$

$$V = 2\pi r \Delta r \Delta x$$

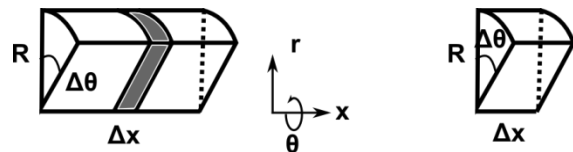
II.E. DIFFERENTIAL VOLUME ELEMENT OF $\Delta r, \Delta \theta$ ($\Delta r, \Delta \theta, L$)



$$A_x = r \Delta \theta \Delta r \quad A_r = r \Delta \theta L \quad A_\theta = \Delta r L$$

$$V = r \Delta \theta \Delta r L$$

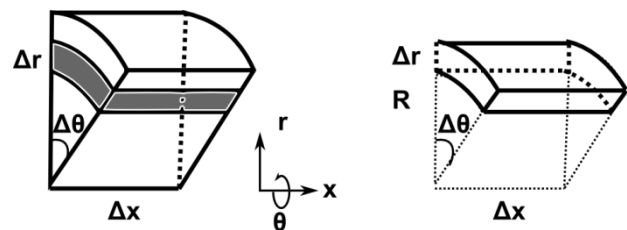
II.F. DIFFERENTIAL VOLUME ELEMENT OF $\Delta x, \Delta \theta$ ($\Delta x, \Delta \theta, R$)



$$A_x = \frac{R^2}{2} \Delta \theta \quad A_r = r \Delta \theta \Delta x \quad A_\theta = R \Delta x$$

$$V = \frac{R^2}{2} \Delta \theta \Delta x$$

II.E. DIFFERENTIAL VOLUME ELEMENT OF $\Delta r, \Delta x, \Delta \theta$



$$A_x = r \Delta \theta \Delta r \quad A_r = r \Delta \theta \Delta x \quad A_\theta = \Delta r \Delta x$$

$$V = r \Delta \theta \Delta r \Delta x$$