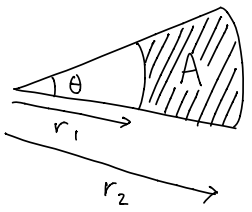
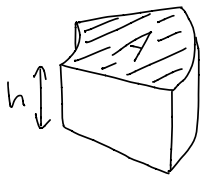


A = full wedge − center wedge

$$A = \left(\pi r_2^2 \cdot \frac{\theta}{2\pi}\right) - \left(\pi r_1^2 \cdot \frac{\theta}{2\pi}\right)$$

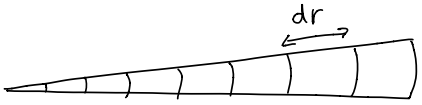
$$A = \frac{1}{2}\theta\left(r_2^2 - r_1^2\right)$$



$$V = A \cdot h$$

$$V = \frac{1}{2}\theta\left(r_2^2 - r_1^2\right)h$$

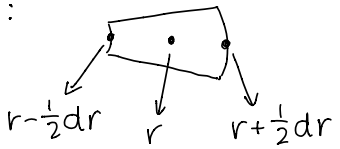
Write $r_1/r_2/h$ in terms of dr & dz (not infinitesimals, but the names of my unit lengths [resolution] in r & z)



0 1 2 3 4 5 6 7 & etc. ⟶ index of the location, i
[Python is zero-indexed]

dist. from axis = $r = i \cdot dr$

Edges of a cell:



$$\Rightarrow r_1 = r - \frac{1}{2}dr = i\,dr - \frac{1}{2}dr$$

$$\Rightarrow r_2 = r + \frac{1}{2}dr = i\,dr + \frac{1}{2}dr$$

$$\Rightarrow A = \frac{1}{2}\theta\left[\left(dr\left(i+\tfrac{1}{2}\right)\right)^2 - \left(dr\left(i-\tfrac{1}{2}\right)\right)^2\right]$$

$$= \frac{1}{2}\theta\left[dr^2\left(i+\tfrac{1}{2}\right)^2 - dr^2\left(i-\tfrac{1}{2}\right)^2\right]$$

$$= \frac{1}{2}\theta\,dr^2\left[\left(i+\tfrac{1}{2}\right)^2 - \left(i-\tfrac{1}{2}\right)^2\right]$$

$$= \frac{1}{2}\theta\,dr^2\left(i^2 + i + \tfrac{1}{4} - \left(i^2 - i + \tfrac{1}{4}\right)\right)$$

$$= \frac{1}{2}\theta\,dr^2\left(\cancel{i^2} + i + \cancel{\tfrac{1}{4}} - \cancel{i^2} + i - \cancel{\tfrac{1}{4}}\right)$$

$$= \cancel{\tfrac{1}{2}}\theta\,dr^2 \cdot \cancel{2}i$$

$$A = i\theta\,dr^2$$

(θ doesn't drop out!)

and since $h = dz$, $\boxed{V = i\theta\,dr^2dz}$

Calculating energy in the cells:

$$Q = mc\Delta T$$
$$= \rho V c \Delta T$$
$$= (\rho c \Delta T)(i\theta\, dr^2 dz)$$

Could try calling $\theta = 1$, but 1 rad is ~large