> $restart : with(VectorCalculus) : with(LinearAlgebra) :$
$SetCoordinates(cylindrical[\mathrm{rho}, \mathrm{theta}, z]) :$

> $v1 := VectorField([diff(\mathrm{rho}\cdot\cos(\mathrm{theta}), \mathrm{rho}), diff(\mathrm{rho}\cdot\sin(\mathrm{theta}), \mathrm{rho}), diff(\mathrm{rho}\cdot\tan(\mathrm{theta})\cdot\sin(\mathrm{theta}), \mathrm{rho})]) :$

> $v2 := VectorField([diff(\mathrm{rho}\cdot\cos(\mathrm{theta}), \mathrm{theta}), diff(\mathrm{rho}\cdot\sin(\mathrm{theta}), \mathrm{theta}), diff(\mathrm{rho}\cdot\tan(\mathrm{theta})\cdot\sin(\mathrm{theta}), \mathrm{theta})]) :$

> $cross := CrossProduct(v1, v2)$

$$cross := [[\sin(\theta)\,(\rho\,(1+\tan(\theta)^2)\sin(\theta) + \rho\tan(\theta)\cos(\theta)) - \tan(\theta)\sin(\theta)\,\rho\cos(\theta)], [-\cos(\theta)\,(\rho\,(1+\tan(\theta)^2)\sin(\theta) + \rho\tan(\theta)\cos(\theta)) - \tan(\theta)\sin(\theta)^2\rho], [\cos(\theta)^2\rho + \sin(\theta)^2\rho]] \quad (1)$$

> $assume(\mathrm{rho} \; R \;\; 0) :$
$n := \frac{simplify(\mathrm{sqrt}(cross[1]^2 + cross[2]^2 + cross[3]^2))}{\mathrm{rho}}$
 # we doen de jacobiaan weg en voegen hem ergens anders toe

$$n := \sqrt{-2 + 2\sec(\theta)^2 + \sec(\theta)^4} \quad (2)$$

> *# eerst calculeren we de rho gedeelte*

> $assume(\mathrm{theta} \; R \;\; 0, \mathrm{theta} \leq 2*\mathrm{Pi});$
$res1 := int\left(\mathrm{rho}\cdot\left(1 - \frac{\rho^2}{R^2}\right), \mathrm{rho} = 0..R\right)$

$$res1 := \frac{R^2}{4} \quad (3)$$

> $res2 := int(n, \mathrm{theta} = 0..2\cdot\mathrm{Pi})$

$$res2 := \int_0^{2\pi} \sqrt{-2 + 2\sec(\theta\sim)^2 + \sec(\theta\sim)^4}\, \mathrm{d}\theta\sim \quad (4)$$

> $res1\cdot res2\cdot v0\cdot rho0$

$$\frac{R^2\left(\int_0^{2\pi} \sqrt{-2 + 2\sec(\theta\sim)^2 + \sec(\theta\sim)^4}\, \mathrm{d}\theta\sim\right) v0\, \rho 0}{4} \quad (5)$$

>