16.5 Surface Integrals and Surface Area

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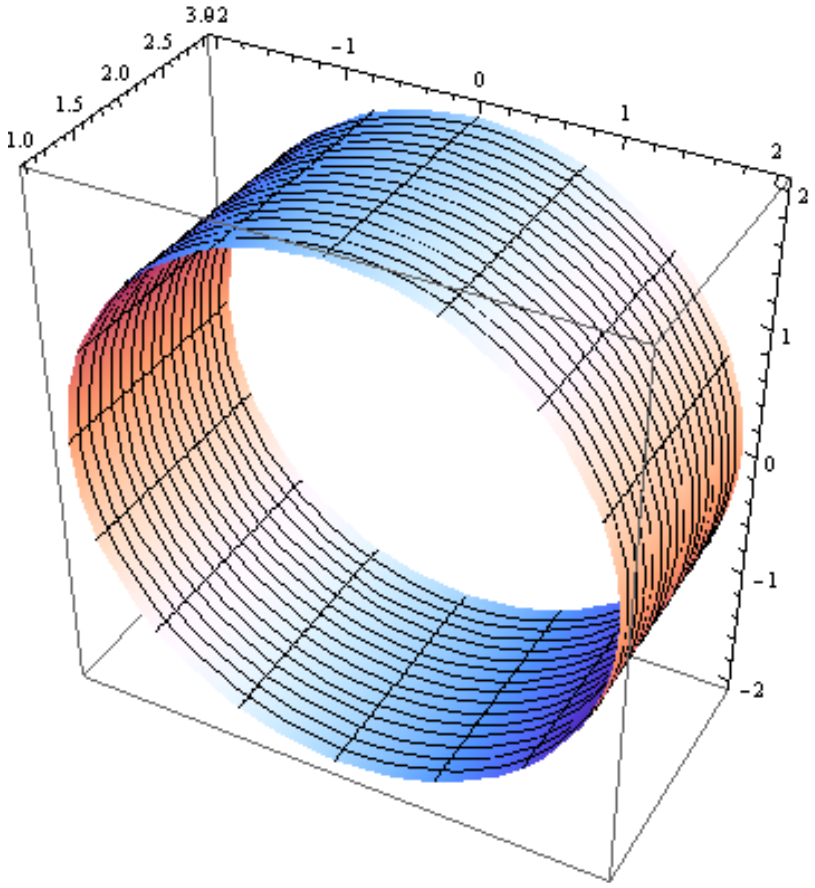
Surface σ : **r**(u,v) = {2Cos[v], u, 2Sin[v]}

Density: $f(x,y,z) = \dfrac{x^2+y^2}{y}$



$$\frac{\partial r}{\partial u}\times\frac{\partial r}{\partial v} = \{2\text{Cos}[v], 0, 2\text{Sin}[v]\}$$

$$Surface\,Area = \iint_{\sigma} dS = \iint_{R}\left\|\frac{\partial r}{\partial u}\times\frac{\partial r}{\partial v}\right\| dA = 8\pi$$

$$Mass = \iint_{\sigma} f(x,y,z)dS = \iint_{R} f(u,v)\left\|\frac{\partial r}{\partial u}\times\frac{\partial r}{\partial v}\right\| dA =$$

$$= \iint_{R}\frac{8}{u}\,dA = 16\pi\, Ln3$$