Unit 10: Functions

1. Compute the limit $\tan(t)/t$ for $t \to 0$ using l’Hopital.

2. Compute the limit $(x^2 - 1)/(x^2 + 1)$ for $x \to \infty$ using l’Hopital.

3. Compute the limit $\sin^2(x)/x^2$ for $x \to 0$ using l’Hopital.

4. Is the function $f(x, y) = (x^4 + y^4)/(x^2 + y^2)^2$ with $f(0, 0) = 0$ continuous?

5. Is the curve

   $$\vec{r}(t) = [\cos(t), \sin(t), \sin(t)/t]$$

   with $\vec{r}'(0) = [1, 0, 1]$ continuous?

6. Can you plot the surface

   $$\vec{r}(\theta, z) = [\cos^3(\theta), \sin^3(\theta), z]$$?