

- 5.30 Create x and y vectors from -5 to $+5$ with a spacing of 0.5 . Use the `meshgrid` function to map x and y onto two new two-dimensional matrices called X and Y . Use your new matrices to calculate vector Z , with magnitude

$$Z = \sin(\sqrt{X^2 + Y^2})$$

- Use the mesh plotting function to create a three-dimensional plot of Z .
- Use the `surf` plotting function to create a three-dimensional plot of Z . Compare the results you obtain with a single input (Z) with those obtained with inputs for all three dimensions (X , Y , Z).
- Modify your surface plot with interpolated shading. Try using different `colormaps`.
- Generate a contour plot of Z .
- Generate a combination surface and contour plot of Z .

1. The position of a moving particle as a function of time is given by:

$$x = \left[\frac{(t-15)}{100} + 1 \right] \sin(3t) \quad y = \left[\frac{(t-15)}{100} + 1 \right] \cos(0.8t) \quad z = 0.4t^{(3/2)}$$

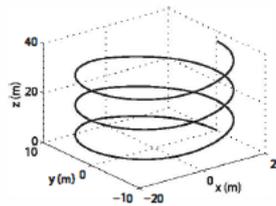
Plot the position of the particle for $0 \leq t \leq 30$.

2. An elliptical staircase that decreases can be modeled by the parametric equations

$$x = r \cos(t) \quad y = r \sin(t) \quad z = \frac{ht}{\pi n}$$

where $r = \frac{ab}{\sqrt{[b \cos(t)]^2 + [a \sin(t)]^2}}$, a and

b are the semimajor and semiminor axes of the ellipse, h is the staircase height, and n is the number of revolutions that the staircase makes. Make a 3-D plot of the staircase with $a = 20$ m, $b = 10$ m, $h = 18$ m, and $n = 3$. (Create a vector t for the domain 0 to $2\pi n$, and use the `plot3` command.)



4. Make a 3-D surface plot of the function $z = \frac{y^2}{4} - 2 \sin(1.5x)$ in the domain $-3 \leq x \leq 3$ and $-3 \leq y \leq 3$.

6. Make a 3-D mesh plot of the function $z = \frac{-\cos(2R)}{e^{0.2R}}$, where $R = \sqrt{x^2 + y^2}$ in the domain $-5 \leq x \leq 5$ and $-5 \leq y \leq 5$.

8. Make a plot of the ice cream cone shown in the figure. The cone is 8 in. tall with a 4 in. diameter base. The ice cream at the top is a 4 in. diameter hemisphere.

A parametric equation for the cone is:

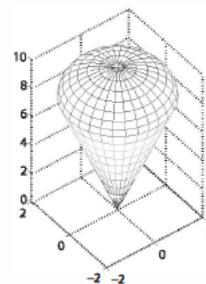
$$x = r \cos \theta, \quad y = r \sin \theta, \quad z = 4r$$

with $0 \leq \theta \leq 2\pi$ and $0 \leq r \leq 2$

A parametric equation for a sphere is:

$$x = r \cos \theta \sin \phi, \quad y = r \sin \theta \sin \phi, \quad z = r \cos \phi$$

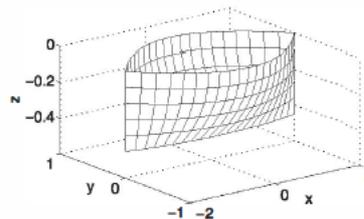
with $0 \leq \theta \leq 2\pi$ and $0 \leq \phi \leq \pi$



19. The geometry of a ship hull (Wigley hull) can be modeled by the equation

$$y = \mp \frac{B}{2} \left[1 - \left(\frac{2x}{L} \right)^2 \right] \left[1 - \left(\frac{2z}{T} \right)^2 \right]$$

where x , y , and z are the length, width, and height, respectively. Use MATLAB to make a 3-D figure of the hull as shown. Use $B = 1.2$, $L = 4$, $T = 0.5$, $-2 \leq x \leq 2$, and $-0.5 \leq z \leq 0$.



Soru: $\sin(x) = \lim_{N \rightarrow \infty} \sum_{n=0}^N (-1)^n \frac{x^{2n+1}}{(2n+1)!}$ serisini $N = 50$ için $x = \frac{\pi}{6}$, $x = \frac{\pi}{3}$, $x = \frac{\pi}{2}$ için

hesaplayıp toplamları karşılaştıran bir tablo yapınız.

Soru: $P(x) = \sum_{n=0}^N c_n x^n$ polinomunu $N = 7$ ve $x = 3, x = -1, x = 2, x = 4$ ve

$c_0 = -4, c_1 = 5, c_2 = -1, c_3 = 10, c_4 = -2, c_5 = 1, c_6 = 4, c_7 = -2$ için hesaplayınız.