

Soal Kalkulus BAB 13

Muhammad Haekal Muhyidin Al-Araby
5024221030

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Soal

23. $x = t, y = \frac{1}{1+t^2}, z = t^2$

Jawab : Semua bilangan real memenuhi persamaan sehingga didapat grafik

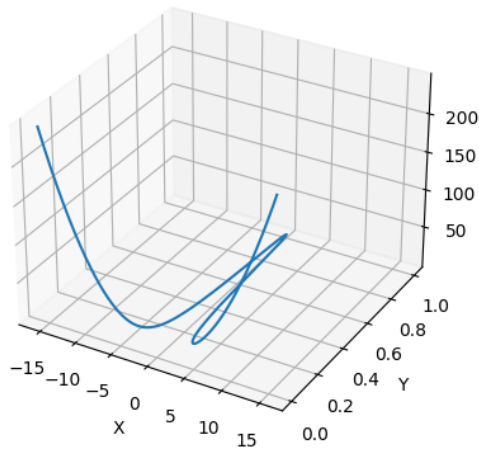


Figure 1: No. 23

27. Show that the curve with parametric equations $x = t \cos t, y = t \sin t, z = t$ lies on the cone $z^2 = x^2 + y^2$, and use this fact to help sketch the curve.

Jawab: Semua bilangan real memenuhi persamaan sehingga didapat grafik, Didapat bahwa persamaan parametrik berada pada permukaan kerucut

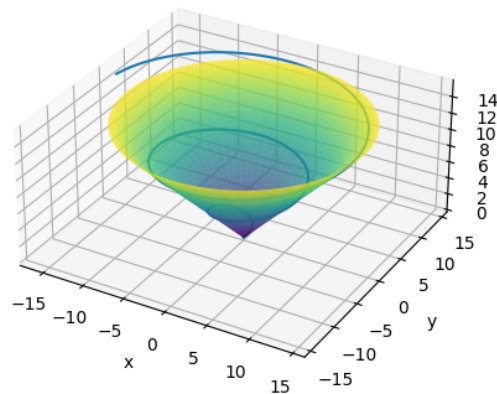


Figure 2: No. 27

31 - 35 Use a computer to graph the curve with the given vector equation. Make sure you choose a parameter domain and viewpoint that reveal the true nature of the curve.

31. $r(t) = \langle \cos t \sin 2t, \sin t \sin 2t, \cos 2t \rangle$

Jawab: Semua bilangan real memenuhi persamaan sehingga didapat grafik

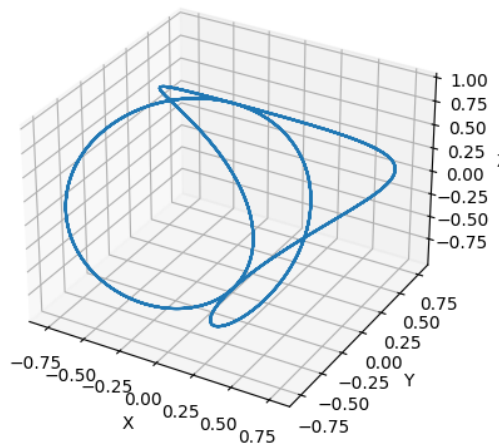


Figure 3: No. 31

32. $r(t) = \langle t^2, \ln t, t \rangle$

Jawab: Karena terdapat $\ln t$ dimana t tidak boleh negatif maka domainnya adalah $t > 0$ sehingga didapat grafik

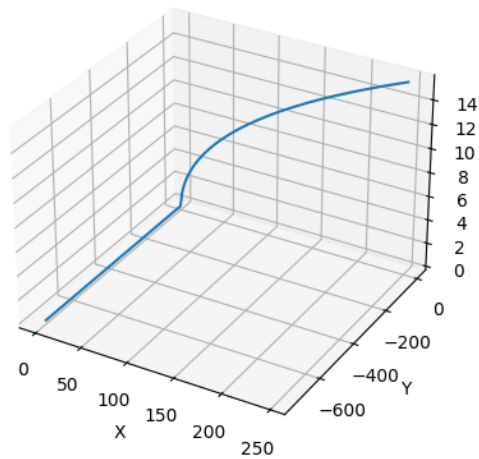


Figure 4: No. 32

33. $r(t) = \langle t, t \sin t, t \cos t \rangle$

Jawab: Semua bilangan real memenuhi persamaan sehingga didapat grafik dan berbentuk seperti 2 kerucut horizontal yang saling berlawanan arah

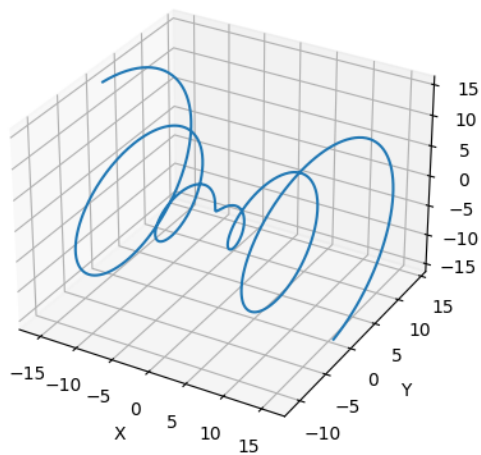


Figure 5: No. 33

34. $r(t) = \langle t, e^t, \cos t \rangle$

Jawab: Semua bilangan real memenuhi persamaan sehingga didapat grafik.

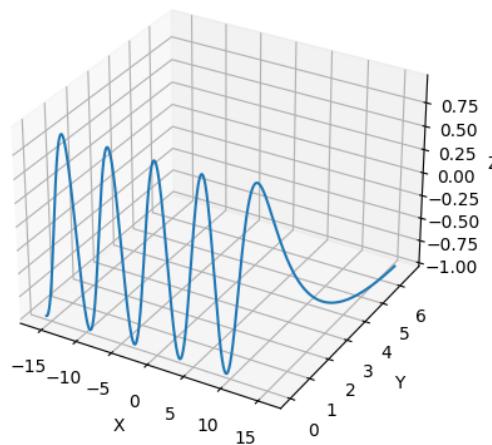


Figure 6: No. 34

35. $r(t) = \langle \cos 2t, \cos 3t, \cos 4t \rangle$

Jawab: Semua bilangan real memenuhi persamaan sehingga didapat grafik

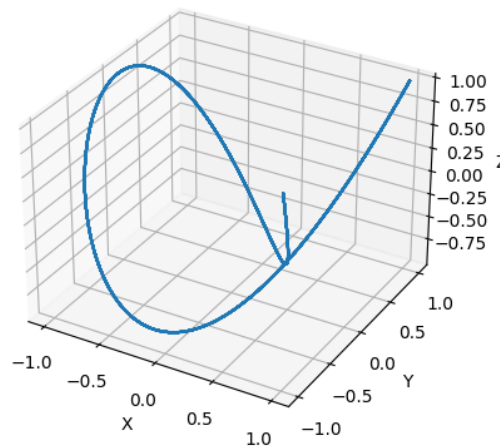


Figure 7: No. 35

36. Graph the curve with parametric equations $x = \sin t, y = \sin 2t, z = \cos 3t$. Explain its shape by graphing its projections onto the three coordinate planes.

Jawab: Semua bilangan real memenuhi persamaan sehingga didapat grafik, Lalu didapat juga proyeksi pada tiga bidang koordinat untuk lebih jelas dalam mengetahui bentuknya

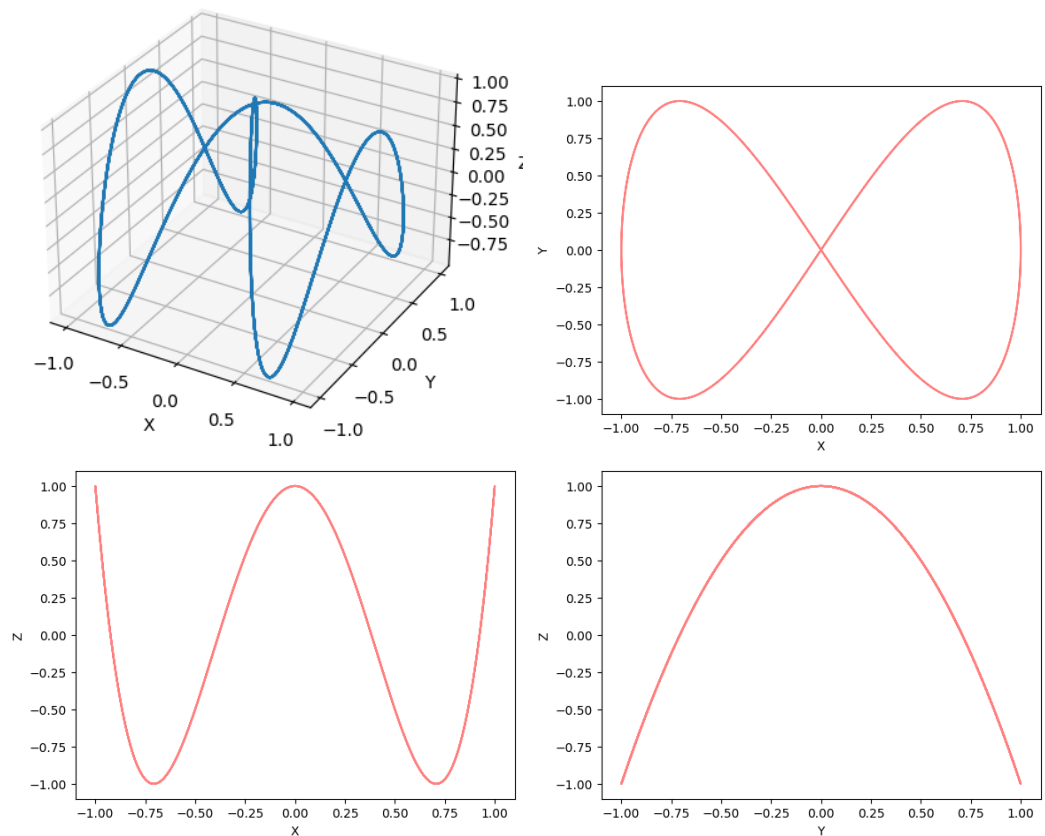


Figure 8: No. 36

37. Graph the curve with parametric equations

$$\begin{aligned}x &= (1 + \cos 16t) \cos t \\y &= (1 + \cos 16t) \sin t \\z &= 1 + \cos 16t\end{aligned}$$

Explain the appearance of the graph by showing that it lies on a cone

Jawab: Semua bilangan real memenuhi persamaan sehingga didapat grafik, Lalu juga didapat bahwa persamaan parametrik tersebut terlihat seperti gelombang pada permukaan kerucut.

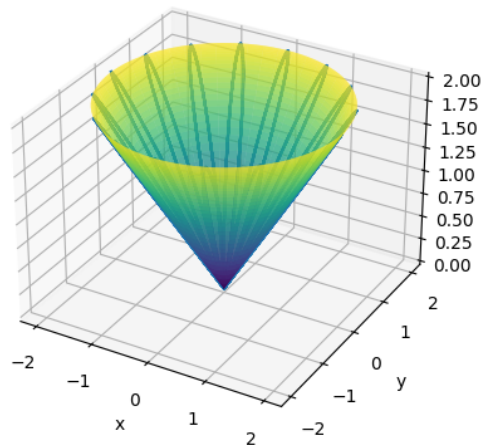


Figure 9: No. 37

38. Graph the curve with parametric equations

$$x = \sqrt{1 - 0.25 \cos^2 t} \cos t$$

$$y = \sqrt{1 - 0.25 \cos^2 t} \sin t$$

$$z = 0.5 \cos 10t$$

Explain the appearance of the graph by showing that it lies on a sphere.

Jawab: Semua bilangan real memenuhi persamaan sehingga didapat grafik, Lalu didapat seperti gelombang pada permukaan bola. Bola didapat dengan plotting Bola dengan pusat (0, 0) dan jari jari 1

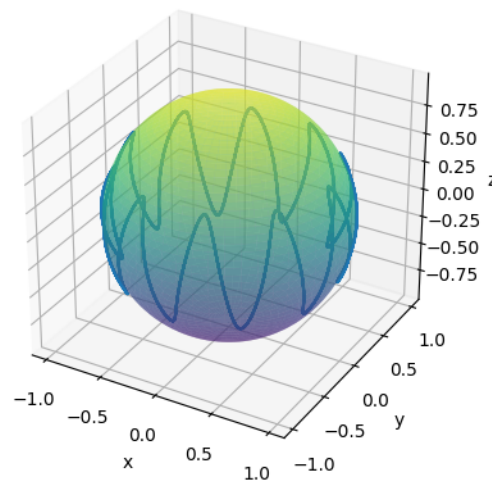


Figure 10: No. 38

41. The cone $z = \sqrt{x^2 + y^2}$ and the plane $z = 1 + y$

Jawab: Semua bilangan real memenuhi persamaan sehingga didapat grafik, dan diketahui bahwa bidang $z = 1 + y$ memotong kerucut $z = \sqrt{x^2 + y^2}$

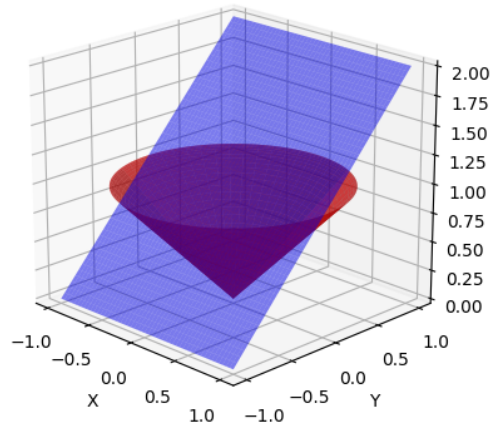


Figure 11: No. 41

45. Try to sketch by hand the curve of intersection of the circular cylinder $x^2 + y^2 = 4$ and the parabolic cylinder $z = x^2$. The find parametric equation for this curve and use these equations and a computer to graph the curve.

Jawab: Semua bilangan real memenuhi persamaan. Lalu didapat persamaan parametriknya

$$\begin{aligned} x^2 + y^2 &= 4 \\ z &= x^2 \end{aligned}$$

maka

$$\begin{aligned} x &= 2 \cos t \\ y &= 2 \sin t \\ z &= x^2 \\ &= (2 \cos t)^2 \\ &= 4 \cos^2 t \end{aligned}$$

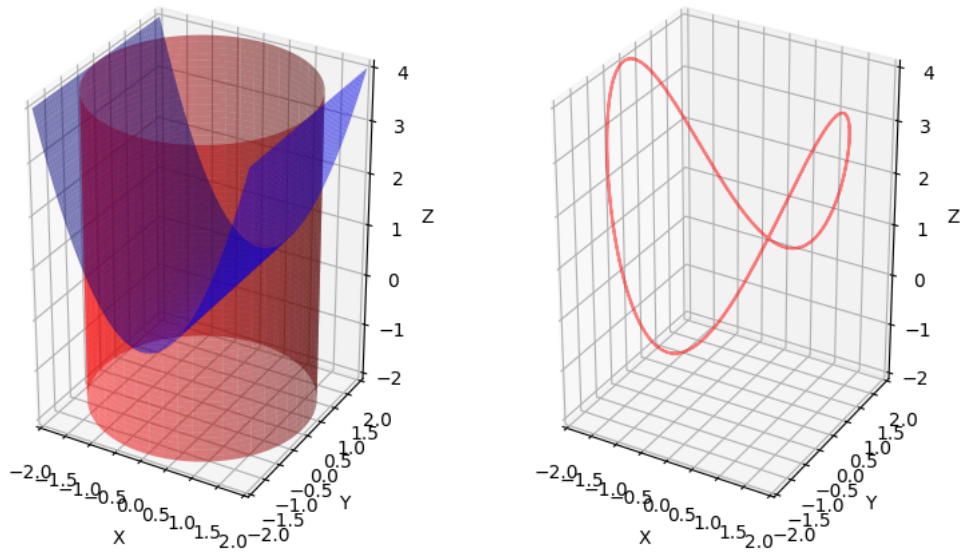


Figure 12: No. 45

46. Try to sketch by hand the curve of intersection of the parabolic cylinder $y = x^2$ and the top half of the ellipsoid $x^2 + 4y^2 + 4z^2 = 16$. Then find parametric equations for this curve and use these equations and a computer to graph the curve.

Jawab: Semua bilangan real memenuhi persamaan. Lalu didapat persamaan parametriknya

$$y = x^2$$

$$x^2 + 4y^2 + 4z^2 = 16$$

maka

$$x = t$$

$$y = t^2$$

$$4z^2 = 16 - x^2 - 4y^2$$

$$z^2 = 4 - \frac{x^2}{4} - y^2$$

$$z = \sqrt{4 - \frac{x^2}{4} - y^2}$$

$$z = \sqrt{4 - \frac{t^2}{4} - t^4}$$

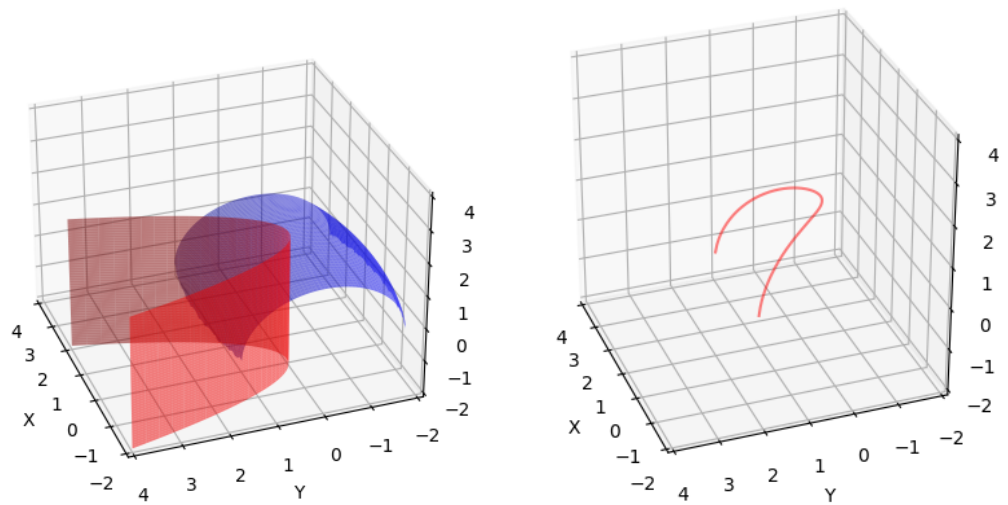


Figure 13: No. 46

50. The view of the trefoil knot shown in Figure 8 is accurate, but it doesn't reveal the whole story. Use the parametric equations

$$\begin{aligned}x &= (2 + \cos 1.5t) \cos t \\y &= (2 + \cos 1.5t) \sin t \\z &= \sin 1.5t\end{aligned}$$

to sketch the curve by hand as viewed from above, with gaps indicating where the curve passes over itself. Start by showing that the projection of the curve onto the xy -plane has polar coordinates $r = 2 + \cos 1.5t$ and $\theta = t$, so r varies between 1 and 3. Then show that z has maximum and minimum values when the projection is halfway between $r = 1$ and $r = 3$. When you have finished your sketch, use a computer to draw the curve with viewpoint directly above and compare with your sketch. Then use the computer to draw the curve from several other viewpoints. You can get a better impression of the curve if you plot a tube with radius 0.2 around the curve. (Use the `tubeplot` command in Maple or the `tubecurve` or `Tube` command in Mathematica.)

Jawab: Semua bilangan real memenuhi persamaan. Grafik dan proyeksinya terhadap ke tiga bidang adalah

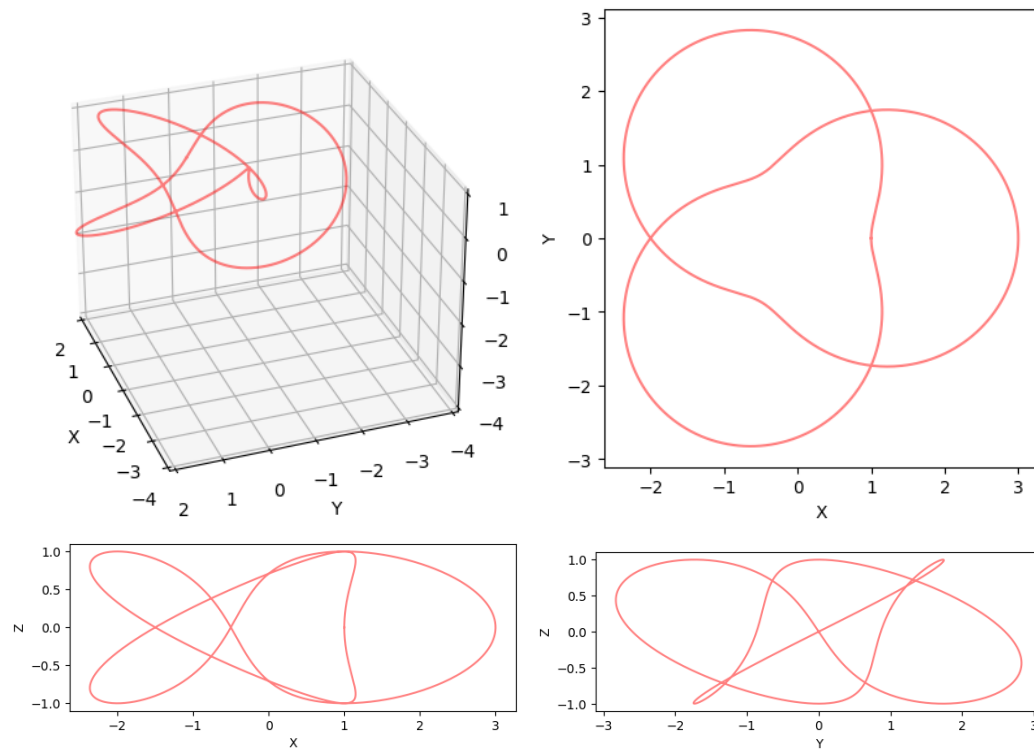


Figure 14: No. 50

didapat bahwa proyeksi pada bidang xy lebih menunjukkan bentuk sebenarnya dari fungsi parametrik tersebut.