

Lista de Exercícios de GA

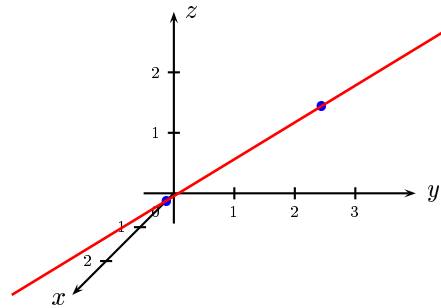
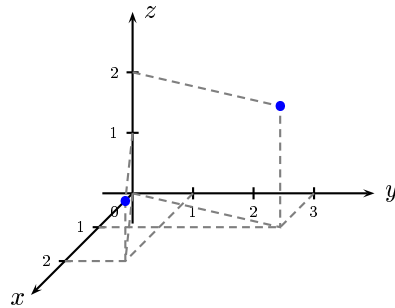
Capítulo 3: Curvas no espaço

Exemplo 1: esboce a reta dada pelas equações paramétricas

$$\begin{cases} x = 2 - t, \\ y = 1 + 2t, \\ z = 1 + t. \end{cases}$$

Solução:

t	x	y	z
0	2	1	1
1	1	3	2



E1) Esboce as retas dadas pelas seguintes equações paramétricas:

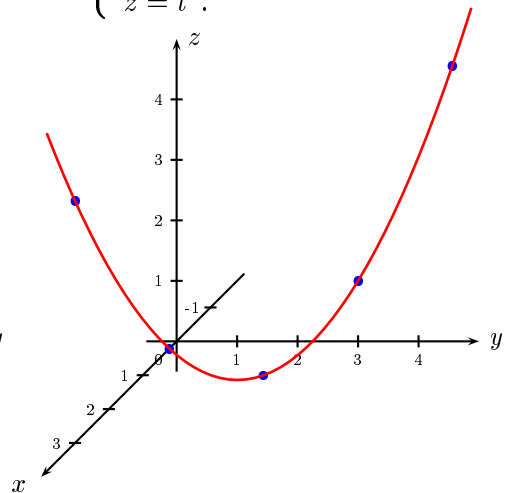
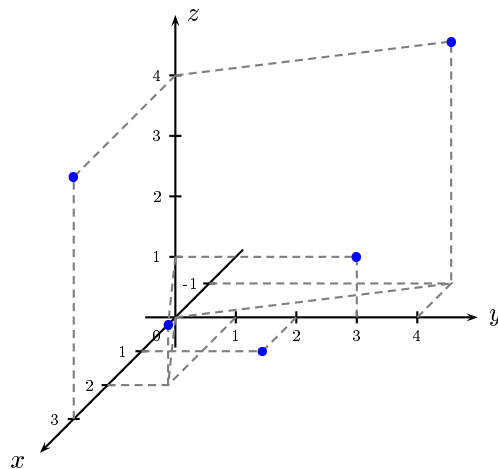
a) $\begin{cases} x = 1 + t, \\ y = 2 - t, \\ z = t; \end{cases}$ b) $\begin{cases} x = 3 + 2t, \\ y = 1 - 3t, \\ z = 2t. \end{cases}$

Exemplo 2: esboce a parábola dada pelas equações paramétricas

$$\begin{cases} x = 1 - t, \\ y = 2 + t, \\ z = t^2. \end{cases}$$

Solução:

t	x	y	z
-2	3	0	4
-1	2	1	1
0	1	2	0
1	0	3	1
2	-1	4	4



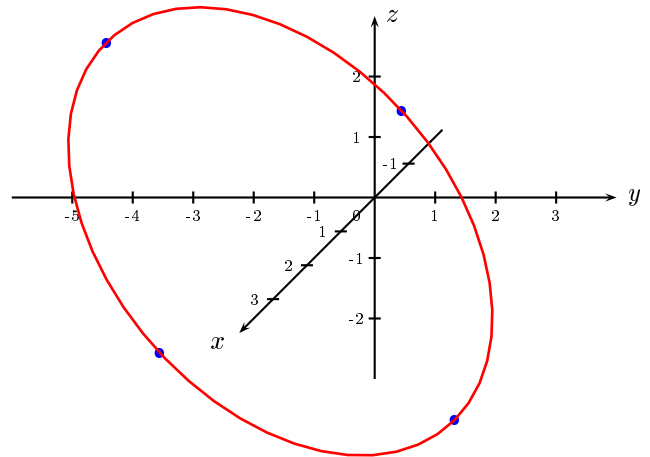
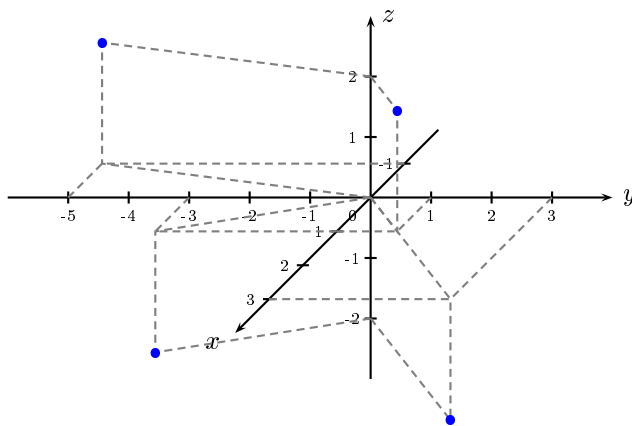
E2) Esboce as parábolas dadas pelas seguintes equações paramétricas:

a) $\begin{cases} x = t, \\ y = t^2, \\ z = 1 + t; \end{cases}$ b) $\begin{cases} x = 1 + t, \\ y = 2 - t, \\ z = 2 - t^2. \end{cases}$

Exemplo 3: esboce a circunferência dada pelas equações paramétricas $\begin{cases} x = 1 + 2 \cos t, \\ y = -1 + 4 \cos t + 2 \operatorname{sen} t, \\ z = -2 \cos t + 2 \operatorname{sen} t. \end{cases}$

Solução:

t	x	y	z
0	3	3	-2
$\frac{\pi}{2}$	1	1	2
π	-1	-5	2
$\frac{3\pi}{2}$	1	-3	-2



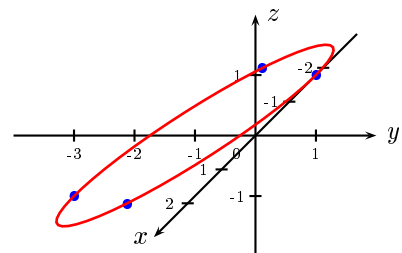
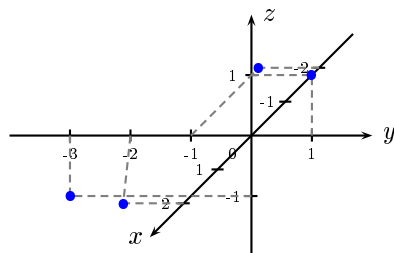
E3) Esboce as circunferências dadas pelas seguintes equações paramétricas:

a) $\begin{cases} x = \cos t + 2 \operatorname{sen} t, \\ y = -\cos t, \\ z = 2 \cos t - \operatorname{sen} t; \end{cases}$ b) $\begin{cases} x = 2 \cos t, \\ y = -2 \operatorname{sen} t, \\ z = -2 \cos t + 2 \operatorname{sen} t. \end{cases}$

Exemplo 4: esboce a elipse dada pelas equações paramétricas $\begin{cases} x = 2 \cos t, \\ y = -1 + 2 \operatorname{sen} t, \\ z = \operatorname{sen} t. \end{cases}$

Solução:

t	x	y	z
0	2	-1	0
$\frac{\pi}{2}$	0	1	1
π	-2	-1	0
$\frac{3\pi}{2}$	0	-3	-1



E4) Esboce as elipses dadas pelas seguintes equações paramétricas:

a) $\begin{cases} x = \cos t, \\ y = \operatorname{sen} t, \\ z = 2 \cos t; \end{cases}$ b) $\begin{cases} x = \cos t + \operatorname{sen} t, \\ y = \cos t - \operatorname{sen} t, \\ z = \operatorname{sen} t. \end{cases}$

Exemplo 5: esboce a hipérbole dada pelas equações paramétricas $\begin{cases} x = \pm 2 \cosh t, \\ y = -1 \pm 2 \sinh t, \\ z = \pm \sinh t. \end{cases}$

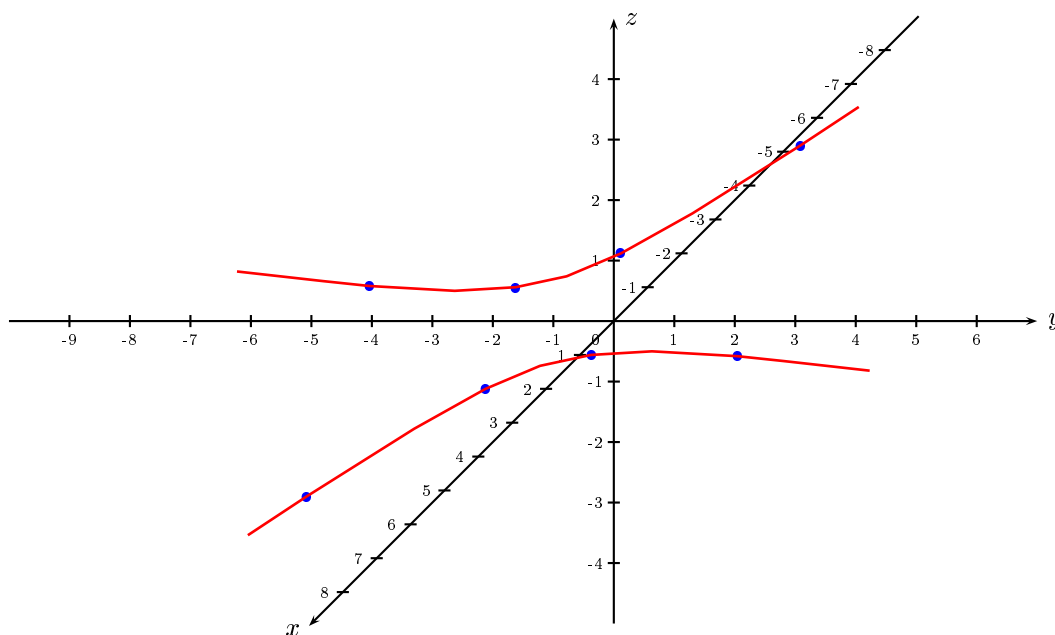
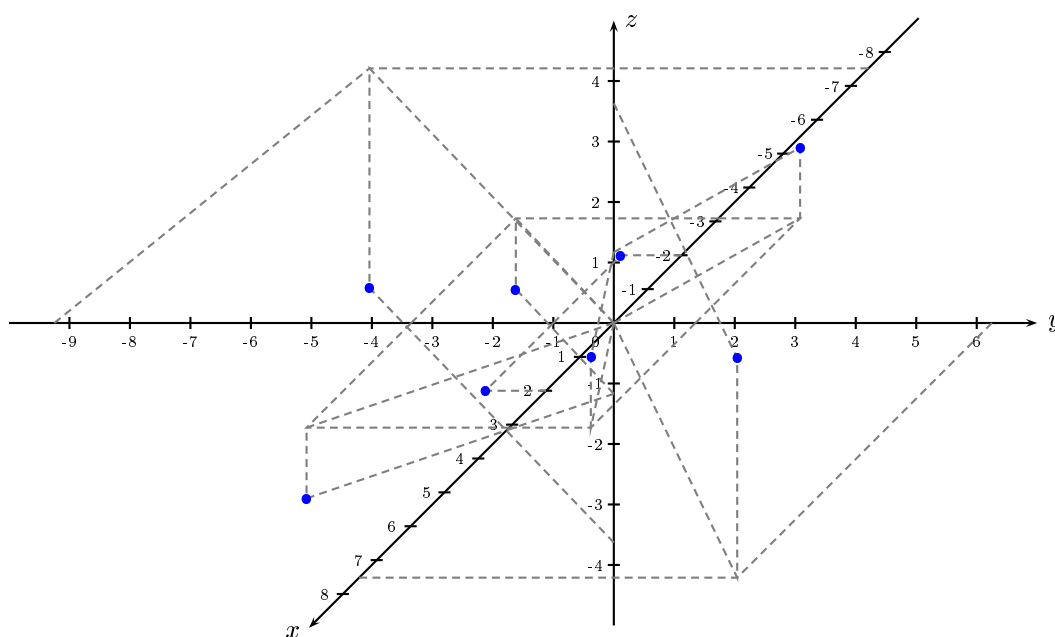
Solução:

$$\begin{cases} x = 2 \cosh t, \\ y = -1 + 2 \sinh t, \\ z = \sinh t. \end{cases}$$

$$\begin{cases} x = -2 \cosh t, \\ y = -1 - 2 \sinh t, \\ z = -\sinh t. \end{cases}$$

t	x	y	z
-2	$\approx 7,52$	$\approx -8,25$	$\approx -3,63$
-1	$\approx 3,09$	$\approx -3,35$	$\approx -1,17$
0	2	-1	0
1	$\approx 3,09$	$\approx 1,35$	$\approx 1,17$
2	$\approx 7,52$	$\approx 6,25$	$\approx 3,63$

t	x	y	z
-2	$\approx -7,52$	$\approx 6,25$	$\approx 3,63$
-1	$\approx -3,09$	$\approx 1,35$	$\approx 1,17$
0	-2	-1	0
1	$\approx -3,09$	$\approx -3,35$	$\approx -1,17$
2	$\approx -7,52$	$\approx -8,25$	$\approx -3,63$



E5) Esboce as hipérboles dadas pelas seguintes equações paramétricas:

$$\text{a) } \begin{cases} x = \pm \cosh t, \\ y = \pm \sinh t, \\ z = \pm 2 \cosh t; \end{cases} \quad \text{b) } \begin{cases} x = \pm(\cosh t + \sinh t), \\ y = \pm(\cosh t - \sinh t), \\ z = \pm \sinh t. \end{cases}$$