

Exercício 6

(1) $\vec{v} \times \vec{v} = 0, \vec{v} \cdot \vec{v} = 3$

(2) $\vec{v} \times \vec{v} = 0, \vec{v} \cdot \vec{v} = 0$

(3)

(4) $\vec{v} \times \vec{v} = \left(x - \frac{x}{z^2}, -\frac{y}{z^2}, -\frac{1}{z}, 0 \right)$

(5) $\vec{v} \times \vec{v} = 0, \vec{v} \cdot \vec{v} = \frac{1}{x^2 + y^2 + z^2}$

Exercício 7

(1) $\Delta f = 4$

(2) $\Delta f = 0$

Exercício 8

$\sigma(2), (4), (5)$

Exercício 9

(1) ~~$x = u$~~ $\begin{cases} x = u \\ y = v \\ z = -2u + v + 5 \end{cases}$

(2) $\begin{cases} x = u - v + 2 \\ y = -u + 2v - 1 \\ z = u - v + 1 \end{cases} \quad (u, v) \in \mathbb{R}^2$

(3) $\begin{cases} x = 4 + 5 \sin \varphi \cos \theta \\ y = 2 + 5 \sin \varphi \sin \theta \\ z = 3 + 5 \cos \varphi \end{cases}$
 $\varphi \in [0, \pi]$
 $\theta \in [0, 2\pi]$

(4) $x = u, y = v, z = u^2 + v^2$