1

p	q	r	$\sim p$	$\sim q$	$\sim r$	$(p \wedge q)$	$(p \wedge q) \to r$	$q \to r$	$p \to (q \to r)$	$\sim[(p \wedge q) \to r]$
V	V	V	F	F	F	V	V	V	V	F
V	V	F	F	F	V	V	F	F	F	V
V	F	V	F	V	F	F	V	V	V	F
V	F	F	F	V	V	F	V	V	V	F
F	V	V	V	F	F	F	V	V	V	F
F	V	F	V	F	V	F	V	F	V	F
F	F	V	V	V	F	F	V	V	V	F
F	F	F	V	V	V	F	V	V	V	F

$\sim[(p \wedge q) \to r] \vee [p \to (q \to r)]$

$\sim[(p \wedge q) \to r] \vee [p \to (q \to r)]$
V
V
V
V
V
V
V
V

R: É uma tautologia.

$$[(p \wedge q) \to q] \wedge [p \wedge (q \to p)] \equiv p$$

$(p \wedge q) \to q \equiv \sim(p \wedge q) \vee q$

$\Leftrightarrow \sim(p \wedge q) \equiv (\sim p \vee \sim q) \vee q$

$\Leftrightarrow (\sim p \vee \sim q) \vee q \equiv \sim p \vee q$

$\Leftrightarrow p \wedge (q \to p) \equiv p \wedge (\sim q \vee p)$

$\Leftrightarrow p \wedge (\sim q \vee p) \equiv (p \wedge \sim q) \vee (p \wedge p)$

$\Leftrightarrow (p \wedge \sim p) \vee p \equiv p$

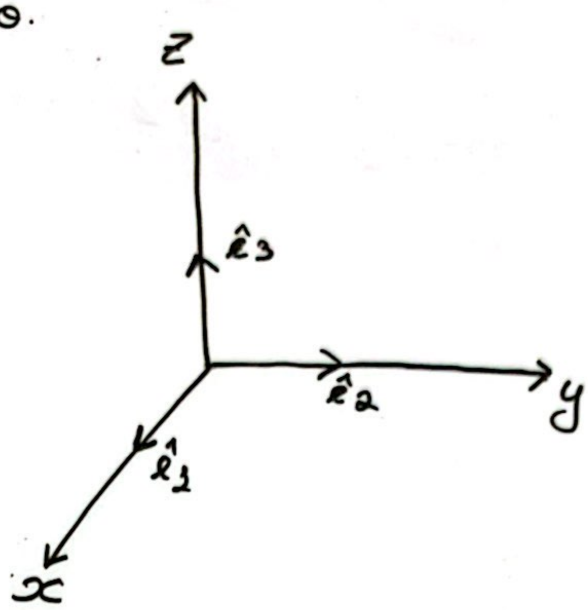
$\Leftrightarrow (\sim p \wedge p) \wedge p$

$\Leftrightarrow (\sim p \wedge p) \vee (q \wedge p)$

$\Leftrightarrow F \vee (q \wedge p)$

$\Leftrightarrow q \wedge p \equiv p$

2º capítulo.



$\hat{e}_1 = (1, 0, 0)$
$\hat{e}_2 = (0, 1, 0)$
$\hat{e}_3 = (0, 0, 1)$

$$(2, -7, 0) = 2\hat{e}_1 - 7\hat{e}_2 + 0\hat{e}_3$$

$$(x, y, z) = x\hat{e}_1 + y\hat{e}_2 + z\hat{e}_3$$

(x, y, z) é comb. linear de $\hat{e}_1, \hat{e}_2, \hat{e}_3$.

Vetor:

- Direção
- Sentido.
- Comprimento.

$$A \longrightarrow B \qquad \overrightarrow{AB} = B - A$$

$A = (1, 2, 3)$

$B = (2, -3, 0)$

$$\begin{aligned} \overrightarrow{AB} &= (2-1) + ((-3)-2) + (0-3) \\ &= 1 + (-5) + (-3) \\ &= (1, -5, -3) \end{aligned}$$

Comprimento de $\vec{AB}$:

$$\|\vec{AB}\| = \sqrt{1^2 + (-5)^2 + (-3)^2}$$
$$= \sqrt{1 + 25 + 9}$$
$$= \sqrt{35}$$

$$\begin{array}{r|l} 35 & 5 \\ 7 & 7 \\ 1 & \end{array}$$

EX.

$$\begin{array}{r|l} 18 & 2 \\ 9 & 3 \\ 3 & 3 \\ 1 & \end{array} \quad \Leftrightarrow \quad \begin{array}{l} 18 \,\underline{|\,2} \\ \underline{0} \quad 9 \,\underline{|\,3} \\ \quad \underline{0} \quad 3 \,\underline{|\,3} \\ \quad\quad \underline{0} \quad 1 \end{array}$$

- Designa-se por "norma" ou "comprimento" de $\vec{a} = (a_1, a_2, a_3)$ o escalar definida por:

$$\|\vec{a}\| = \sqrt{a_1^2 + a_2^2 + a_3^2}$$

- Quando $\|\vec{a}\| = 1$, $\vec{a}$ diz-se "vetor unitário"

$$\hat{AB} = \frac{\vec{AB}}{\|\vec{AB}\|} = \frac{1}{\sqrt{35}} \times (1,-5,-3)$$

$$= \frac{35}{\sqrt{35}} \times (1,-5,-3)$$

$$= \left(\frac{\sqrt{35}}{35} ; \frac{-5 \cdot \sqrt{35}}{35} ; \frac{-3 \cdot \sqrt{35}}{35} \right)$$

$$\hat{a} = \frac{\vec{a}}{\|\vec{a}\|} = \frac{1}{\sqrt{a_1^2 + a_2^2 + a_3^2}} \cdot (a_1, a_2, a_3)$$