$$B_u = \{u_1, u_2, u_3\} \quad \text{base} \quad \mathbb{R}^3$$

$$\begin{cases} v_1 = 2u_1 - u_2 \\ v_2 = u_1 \qquad\quad - u_3 \\ v_3 = \qquad u_2 \end{cases}$$

a)

$$\left.\begin{matrix} u_1 = (1,1,0) \\ u_2 = (1,0,1) \\ u_3 = (0,1,1) \end{matrix}\right\} \qquad \begin{vmatrix} 2 & 1 & 0 \\ -1 & 0 & 1 \\ 0 & -1 & 0 \end{vmatrix} = -(-1)\begin{vmatrix} 2 & 0 \\ -1 & 1 \end{vmatrix}$$

$$\shortparallel$$

(2) Independencia Lineal

b)

$$\left.\begin{matrix} v_1 = (2 \quad 1 \quad 0)_{B_u} \\ v_2 = (1 \quad 0 \; -1)_{B_u} \\ v_3 = (0 \quad 1 \quad 0)_{B_u} \end{matrix}\right| \begin{matrix} (2,1,0) = 2(1,0,0) + 1(0,1,0) + 0(0,0,1) \\ (2,0,-1) = 2(1,0,0) + 0(0,1,0) - 1(0,0,1) \\ (0,1,0) = 0(1,0,0) + 1(0,1,0) + 0(0,0,1) \end{matrix}$$

c) $(2,1,0)_{B_u} \to B_n$

$v_1 = (2 \quad 1 \quad 0)_{B_u}$ $\qquad B_u \to B_v$

$v_2 = (1 \quad 0 \quad -1)_{B_u}$ $\qquad P = \begin{bmatrix} 1/2 & 0 & 1/2 \\ 0 & 0 & -1 \\ 1/2 & 1 & 1/2 \end{bmatrix}$

$v_3 = (0 \quad 1 \quad 0)_{B_u}$

$(2, 1, 0)_{B_u} \to B_v$

c) $$\begin{array}{c} \begin{pmatrix} 1/2 & 0 & 1/2 \\ 0 & 0 & -1 \\ 1/2 & 1 & 1/2 \end{pmatrix} \\ \begin{array}{ccc} 4u_1 & 4u_2 & 4u_3 \end{array} \end{array} \begin{pmatrix} 2 \\ 3 \\ 1 \end{pmatrix} = \begin{pmatrix} \alpha \\ \beta \\ \gamma \end{pmatrix} \to \left(3/2, -1, 9/2\right)$$

d) $$\begin{pmatrix} 2 & 1 & 0 \\ -1 & 0 & 1 \\ 0 & -1 & 0 \end{pmatrix} \begin{pmatrix} \alpha \\ \beta \\ \gamma \end{pmatrix} = \begin{pmatrix} 2 \\ 3 \\ 1 \end{pmatrix}$$