$x^2 + 5x + 3$ En base canónica de $P_2 = \{1, x, x^2\}$

* Tenemos la base de Legendre: $\left\{1, x, \frac{3}{2}x^2 - \frac{1}{2}\right\}$

* Resolvemos: $(1)_C = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$, $(x)_C = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$

$$\left(\frac{3}{2}x^2 - \frac{1}{2}\right)_C = \begin{pmatrix} -1/2 \\ 0 \\ 3/2 \end{pmatrix}$$

* Matriz de Cambio de base de C a L: $\begin{pmatrix} 1 & 0 & -1/2 \\ 0 & 1 & 0 \\ 0 & 0 & 3/2 \end{pmatrix}$

* Matriz de Cambio de base de L a C: $\begin{pmatrix} 1 & 0 & -1/2 \\ 0 & 1 & 0 \\ 0 & 0 & 3/2 \end{pmatrix}^{-1}$

$$\left(\begin{array}{ccc|ccc} 1 & 0 & -1/2 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 3/2 & 0 & 0 & 1 \end{array}\right) R_3\left(\frac{2}{3}\right) \longrightarrow R_3$$

$$\left(\begin{array}{ccc|ccc} 1 & 0 & -1/2 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 2/3 \end{array}\right) R_1 + \frac{R_3}{2} \longrightarrow R_1$$

$$\left(\begin{array}{ccc|ccc} 1 & 0 & 0 & 1 & 0 & 1/3 \\ 0 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 2/3 \end{array}\right) \longrightarrow M_{1C} = \begin{pmatrix} 1 & 0 & 1/3 \\ 0 & 1 & 0 \\ 0 & 0 & 2/3 \end{pmatrix}$$

$$\left(3 + 5x + x^2\right)_1 = \begin{pmatrix} 1 & 0 & 1/3 \\ 0 & 1 & 0 \\ 0 & 0 & 2/3 \end{pmatrix} \begin{pmatrix} 3 \\ 5 \\ 1 \end{pmatrix} = \begin{pmatrix} 10/3 \\ 5 \\ 2/3 \end{pmatrix}$$

$$3 + 5x + x^2 = \frac{10}{3}(1) + 5(x) + \frac{2}{3}\left(\frac{3}{2}x^2 - \frac{1}{2}\right)$$

R/. $$3 + 5x + x^2 = \frac{10}{3} P_0(x) + 5 P_1(x) + \frac{2}{3} P_2(x)$$

$\blacksquare$