

Ejercicio Teórico punto 21:

$$\int_{-1}^1 P_n(x) P_m(x) dx = \frac{2}{2n+1} \delta_{mn}$$

$$f(x) = \sum_{i=1}^n c_i P_i(x) \rightarrow P_m(x) f(x) = \sum_{i=1}^n c_i P_i(x) P_m(x)$$

$$\int_{-1}^1 P_m(x) f(x) dx = \int_{-1}^1 \sum_{i=1}^n c_i P_i(x) P_m(x) dx$$

$$\int_{-1}^1 P_m(x) f(x) dx = \sum_{i=1}^n c_i \int_{-1}^1 P_i(x) P_m(x) dx$$

$$\int_{-1}^1 P_m(x) f(x) dx = \sum_{i=1}^n c_i \frac{2}{2n+1} \delta_{mn}$$

$$\int_{-1}^1 P_m(x) f(x) dx = c_m \frac{2}{2n+1}$$

$$\frac{2n+1}{2} \int_{-1}^1 P_m(x) f(x) dx = c_m$$



$$c_n = \frac{2n+1}{2} \int_{-1}^1 P_n(x) f(x) dx$$