$$\text{- - - >}\quad \langle x, P_0\rangle = \langle x, 1\rangle = \emptyset \quad (P_0 = 1) \;\Big\}\; \alpha_{10} = \emptyset$$

$$\|P_0\|^2 = \langle P_0, P_0\rangle = \int_{-1}^{1} 1 \cdot 1 \, dx = 2 \qquad\qquad P_1 = x + \emptyset P_0 = x$$

$$\longrightarrow \boxed{P_1 = x}$$

... NEXT,

$$P_2 = x^2 + \alpha_{21} P_1 + \alpha_{20} P_0 \qquad \Big| \cdot P_0 \qquad \Big| \cdot P_1$$

SEEK α_{21}, α_{20} SO

P_1, P_2 ARE ORTHO TO P_2

$$\langle P_2, P_0\rangle = 0$$

$$= \langle x^2, P_0\rangle + \alpha_{21}\cancel{\langle P_1, P_0\rangle} + \alpha_{20}\underbrace{\langle P_0, P_0\rangle}_{\|P_0\|^2} \longrightarrow \alpha_{20} = -\frac{\langle x^2, P_0\rangle}{\|P_0\|^2}$$

$\emptyset$ CAUSE WE... WANT THIS? ✗ NO, WAS

$$\langle x^2, P_0\rangle = \langle x^2, 1\rangle = \frac{2}{3}$$

$$\longrightarrow \boxed{\alpha_{20} = -\frac{2/3}{2} = -\frac{1}{3}}$$

$$\langle P_2, P_1\rangle = 0$$

$$= \langle x^2, P_1\rangle + \alpha_{21}\underbrace{\langle P_1, P_1\rangle}_{\|P_1\|^2} + \alpha_{20}\cancel{\langle P_0, P_1\rangle}^{\emptyset} \longrightarrow \alpha_{21} = -\frac{\langle x^2, P_1\rangle}{\|P_1\|^2}$$

$$\langle x^2, P_1\rangle = \int_{-1}^{1} x^2 x \, dx = \int_{-1}^{1} x^3 \, dx = \emptyset \text{ (ODD FUNC.)} \longrightarrow \boxed{\alpha_{21} = \emptyset}$$