

$$1. \quad x_n = x_{n-1} + 2x_{n-2} - x_{n-3}$$

x_0		1
x_1		2
x_2		-1
x_3		2 = -1 + 2(2) - 1
x_4		-2 = 2 + 2(-1) - 2
x_5		3 = -2 + 2(2) + 1
x_6		-3 = 3 + 2(-2) - 2

$$2. \quad x_n = 5x_{n-1} - 6x_{n-2}$$

$$x_0 = 0 \quad x_1 = 1$$

$$z^2 = 5z - 6$$

$$z^2 - 5z + 6 = 0$$

$$(z-3)(z-2) = 0$$

$$x_n = C_1(3^n) + C_2(2^n)$$

$$x_0 = 0 = C_1 + C_2$$

$$x_1 = 1 = 3C_1 + 2C_2$$

$$C_1 = -C_2$$

$$1 = 2C_2 - 3C_2$$

$$1 = -1C_2$$

$$C_2 = -1$$

$$C_1 = 1$$

$$x_n = 3^n - (2^n)$$

3.

$$C_n = P_1 C_{n-1} + P_2 C_{n-2} \quad z^n - P_1 z - P_2$$

year count

0 C_0

1 C_1

2 $P_1 C_1 + P_2 C_0$

3 $P_1 (P_1 C_1 + P_2 C_0) + P_2 C_1$

$P_1^2 C_1 + P_1 P_2 C_0 + P_2 C_1$

4 $P_1 [P_1 (P_1 C_1 + P_2 C_0) + P_2 C_1]$

$+ P_2 (P_1 C_1 + P_2 C_0)$