

Math 336 HW 1

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

$$x_0 = 1, x_1 = 2, x_2 = -1$$

$$x_3 = x_2 + 2x_1 - x_0 = -1 + 2(2) - 1 = 2$$

$$x_4 = x_3 + 2x_2 - x_1 = 2 + 2(-1) - 2 = -2$$

$$x_5 = x_4 + 2x_3 - x_2 = -2 + 2(2) - (-1) = 3$$

$$2. x_n = 5x_{n-1} - 6x_{n-2} \quad x_0 = 0, x_1 = 1$$

$$z^k = 5z^{k-1} - 6z^{k-2} \quad k=2$$

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

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

$$z = 2, 3$$

$$x_n = c_1 2^n + c_2 3^n$$

$$x_0 = c_1 + c_2 = 0$$

$$x_1 = c_1 \cdot 2 + c_2 \cdot 3 = 1$$

$$c_1 = -1, c_2 = 1$$

$$x_n = -1(2^n) + 3^n$$

$$x_2 = 5x_1 - 6x_0 = 5(1) - 6(0) = 5$$

$$x_3 = 5x_2 - 6x_1 = 5(5) - 6(1) = 19$$

$$x_2 = -1(2^2) + 3^2 = -4 + 9 = 5$$

$$x_3 = -1(2^3) + 3^3 = -8 + 27 = 19$$



3. $k=3$

$$X_0 = C_0, X_1 = C_1, X_2 = C_2$$

$$X_n = p_1 X_{n-1} + p_2 X_{n-2} + p_3 X_{n-3}$$

$$X_3 = p_1 C_2 + p_2 C_1 + p_3 C_0$$

$$X_4 = p_1 (p_1 C_2 + p_2 C_1 + p_3 C_0) + p_2 C_2 + p_3 C_1$$

