

Home work 4

Task 1. Solve these recurrence relations together with the initial conditions given.

- (a) $a_n = 5a_{n-1} - 6a_{n-2}$ for $n \geq 2$, $a_0 = 1$, $a_1 = 0$;
- (b) $a_n = 4a_{n-1} - 4a_{n-2}$ for $n \geq 2$, $a_0 = 6$, $a_1 = 8$;
- (c) $a_n = -4a_{n-1} - 4a_{n-2}$ for $n \geq 2$, $a_0 = 0$, $a_1 = 1$;
- (d) $a_n = 4an - 2$ for $n \geq 2$, $a_0 = 0$, $a_1 = 4$;
- (e) $a_n = a_{n-2}/4$ for $n \geq 2$, $a_0 = 1$, $a_1 = 0$;
- (f) $a_n = a_{n-1} + 6a_{n-2}$ for $n \geq 2$, $a_0 = 3$, $a_1 = 6$;
- (g) $a_n = 7a_{n-1} - 10a_{n-2}$ for $n \geq 2$, $a_0 = 2$, $a_1 = 1$;
- (h) $a_n = 6a_{n-1} - 8a_{n-2}$ for $n \geq 2$, $a_0 = 4$, $a_1 = 10$;
- (i) $a_n = 2a_{n-1} - a_{n-2}$ for $n \geq 2$, $a_0 = 4$, $a_1 = 1$;
- (j) $a_n = a_{n-2}$ for $n \geq 2$, $a_0 = 5$, $a_1 = -1$;
- (k) $a_n = -6a_{n-1} - 9a_{n-2}$ for $n \geq 2$, $a_0 = 3$, $a_1 = -3$;
- (l) $a_{n+2} = -4a_{n+1} + 5a_n$ for $n \geq 0$, $a_0 = 2$, $a_1 = 8$;
- (m) $a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3}$ for $n \geq 3$, $a_0 = 0$, $a_1 = 1$, $a_2 = 2$;
- (n) $a_n = 2a_{n-1} + a_{n-2} - 2a_{n-3}$ for $n \geq 3$, $a_0 = 3$, $a_1 = 6$, and $a_2 = 0$;
- (o) $a_n = 7a_{n-2} + 6a_{n-3}$ for $n \geq 3$, $a_0 = 9$, $a_1 = 10$, and $a_2 = 32$;
- (p) $a_n = 5a_{n-2} - 4a_{n-4}$ for $n \geq 4$, $a_0 = 3$, $a_1 = 2$, $a_2 = 6$, and $a_3 = 8$;
- (q) $a_n = 2a_{n-1} + 5a_{n-2} - 6a_{n-3}$ for $n \geq 3$, $a_0 = 7$, $a_1 = -4$, and $a_2 = 8$;
- (r) $a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3}$ for $n \geq 3$, $a_0 = -5$, $a_1 = 4$, and $a_2 = 88$;
- (s) $a_n = -3a_{n-1} - 3a_{n-2} - a_{n-3}$ for $n \geq 3$, $a_0 = 5$, $a_1 = -9$, and $a_2 = 15$;
- (t) $a_n = 2a_{n-1} + 2^n$ for $n \geq 1$, $a_0 = 2$;
- (u) $an = -5a_{n-1} - 6a_{n-2} + 42 \cdot 4^n$ for $n \geq 3$, $a_1 = 56$, $a_2 = 278$;
- (v) $a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3} + n^2$ for $n \geq 3$, $a_0 = 1$, $a_1 = 6$, $a_2 = 28$;

$$(w) \ a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3} + n2^n \text{ for } n \geq 3, a_0 = 0, a_1 = 4, a_2 = 32;$$

$$(x) \ a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3} + 2^n \text{ for } n \geq 3, a_0 = 0, a_1 = 4, a_2 = 32;$$

$$(y) \ a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3} + n^2 2^n \text{ for } n \geq 3, a_0 = 0, a_1 = 4, a_2 = 48;$$

$$(z) \ a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3} + n^3(-2)^n \text{ for } n \geq 3, a_0 = 1, a_1 = -4, a_2 = 56;$$