

## 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)  $a_n = 4a_{n-1} - 2$  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)  $a_n = -5a_{n-1} - 6a_{n-2} + 42 \cdot 4^n$  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)  $a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3} + n2^n$  for  $n \geq 3$ ,  $a_0 = 0$ ,  $a_1 = 4$ ,  $a_2 = 32$ ;
- (x)  $a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3} + 2^n$  for  $n \geq 3$ ,  $a_0 = 0$ ,  $a_1 = 4$ ,  $a_2 = 32$ ;
- (y)  $a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3} + n^22^n$  for  $n \geq 3$ ,  $a_0 = 0$ ,  $a_1 = 4$ ,  $a_2 = 48$ ;
- (z)  $a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3} + n^3(-2)^n$  for  $n \geq 3$ ,  $a_0 = 1$ ,  $a_1 = -4$ ,  $a_2 = 56$ ;