MH1812 Tutorial
Chapter 6: Linear Recurrence

Q1: Solve the recurrence relation $a_n = 2a_{n-1} - a_{n-2}$ with initial values $a_1 = 3, a_0 = 0$ using

(a) the backtracking method.
(b) the characteristic equation.

Q2: Solve the recurrence relation

$$a_n = 2a_{n-1} + a_{n-2} - 2a_{n-3}$$

with initial values $a_0 = 1$, $a_1 = 2$ and $a_2 = 0$.

Q3: Let $a_n = c_1 a_{n-1} + c_2 a_{n-2} + \ldots + c_k a_{n-k}$ be a linear homogeneous recurrence. Assume both sequences a_n,a'_n satisfy this linear homogeneous recurrence. Show that $a_n + a'_n$ and αa_n also satisfy it, for α some constant.

Q4: Solve the recurrence relation

$$a_n = 4a_{n-1} - 3a_{n-2}$$

with the initial values $a_1 = 0$ and $a_2 = 12$.

Q5: Solve the recurrence relation

$$a_n = 3a_{n-1} - 1$$

with initial value $a_1 = 1$.

Q6: Solve the recurrence relation:

$$a_n = 4a_{n-1} - 4a_{n-2}$$

with initial values $a_0 = 1$, $a_1 = 3$.