Solving Recurrence Relations

Section 6.2

Degree of a Recurrence Relation

- The *degree* of a recurrence relation is k if the sequence $\{a_n\}$ is expressed in terms of the previous k terms:

$$a_n = c_1 a_{n-1} + c_2 a_{n-2} + \ldots + c_k a_{n-k}$$

where c_1, c_2, …, c_k are real numbers and $c_k \neq 0$

- What is the degree of $a_n = 2a_{n-1} + a_{n-2}$?
- What is the degree of $a_n = a_{n-2} + 3a_{n-3}$?
- What is the degree of $a_n = 3a_{n-4}$?

Linear Recurrence Relations

- A recurrence relation is *linear* when a_n is a sum of multiples of the previous terms in the sequence
- Is $a_n = a_{n-1} + a_{n-2}$ linear ?
- Is $a_n = a_{n-1} + a^2_{n-2}$ linear ?