

MTH 354

10 4-17

§ 71 (cont.)

Ex: \$1000 investment at 12 percent.

 A_n = The amount in the account at the end of n yearsFind a recurrence relation & initial condition that define the sequence $\{A_n\}$.Sol: $A_0 = \$1000$

$$A_1 = \underbrace{1000}_{A_0} + \underbrace{(12)}_{A_0} (\underbrace{1000}_{A_0}) = (1.12) \underbrace{1000}_{A_0}$$

$$A_2 = A_1 + (12) A_1 = (1.12) A_1$$

⋮

$$A_n = (1.12) A_{n-1}, \quad A_0 = 1000$$

Find a closed form for the above RR.

$$A_3 = (1.12) A_2 = (1.12)(1.12) A_1 = (1.12)^2 A_1 = (1.12)^2 (1.12) A_0 = (1.12)^3 A_0$$

$$A_n = (1.12) A_{n-1}$$

$$= (1.12)^{(2)} A_{n-2}$$

⋮

$$= (1.12)^n A_{n-n}$$

$$\boxed{A_n = (1.12)^n A_0} \quad \text{an explicit form}$$

$$A_0 = 1000$$

$$A_1 = 1120$$

$$A_2 = 1254.4$$

$$A_3 = 1404.93$$

§ 7.1 (cont.)

Ex: \$1000 investment at 12 percent.

 A_n = The amount in the account at the end of n yearsFind a recurrence relation & initial condition that define the sequence $\{A_n\}$.Sol: $A_0 = \$1000$

$$A_1 = \underbrace{1000}_{A_0} + (.12)(\underbrace{1000}_{A_0}) = (1.12) \underbrace{1000}_{A_0}$$

$$A_2 = A_1 + (.12)A_1 = (1.12)A_1$$

⋮

$$A_n = (1.12)A_{n-1}, \quad A_0 = 1000$$

Find a closed form for the above R.R.

$$\begin{aligned} A_3 &= (1.12)A_2 = (1.12)(1.12)A_1 = (1.12)^2 A_1 = (1.12)^2 (1.12)A_0 \\ &= (1.12)^3 A_0 \end{aligned}$$

$$A_n = (1.12)A_{n-1}$$

$$= (1.12)^{(2)} A_{n-(2)}$$

⋮

$$= (1.12)^n A_{n-n}$$

$$\boxed{A_n = (1.12)^n A_0} \quad \text{an explicit form}$$

$$A_0 = 1000$$

$$A_1 = 1120$$

$$A_2 = 1254.4$$

$$A_3 = 1404.93$$