

Trace Bloxham

HW 1

Kosytowski

Math modeling

1/25/22

1. $y_0 = 100$ $\Delta y_1 = -.4 y_1$

$$y_{n+1} = y_1 = -.4 y_1$$

$$y_1 - y_0 = -.4 y_0$$

$$y_1 - 100 = (-.4)100$$

$$y_1 = (-.4)100 + 100$$

$$y_1 = -40 + 100 = 60$$

$$y_2 = -.4 \cdot 60 + 60 = 36$$

$$y_3 = 21.6$$

$$y_4 = 12.96$$

$$y_5 = 7.776$$

Q. $y_5 = 7.776$

B. $y_{n+1} = -.4 y_n + y_n$

2. • How much free time do I have each week?

Variables

- important • time Quantity = amount
important • time Quality - how can time be used,
i.e. work break has limited freedom

factors

- time waste - traffic, inefficient schedule
important • Non-free time Quantity - amount

time waste is hard to get clear measurements for, with a lot of study - you could get some min mean max coefficients.

it could be partially accounted for in Quantity and Quality, then dropped.

#3. • Retirement

Factors

- intended retirement age
- Retirement lifestyle (level of wealth in retirement)
- Assets acquirable by retirement
- Pre-retirement lifestyle/income
- expected death age / health & family history
- Environmental Factors

• Everything but environmental factors is keepable. stuff happens.

• With $\left[\text{Health and family life expectancy} \right]$
— $\left[\text{retirement age} \right] = \text{time frame.}$

• retirement lifestyle = cost to gauge over

• Pre retirement handles the \$ before the date,
and from there we get: savable money

• Put savable Money into the Saving Method
with most likely high/safe returns.

#4. $y_0, 4000$

$$y_1 = y_0 (-100 + 400 - 200 - 200)$$

$$y_{t+1} = y_t - 100$$

see code.

Assumptions • The students who stay, continue to stay

- There are always people 1 bonus away from retirement
- There are always people who don't return
- There are always Summer Job Students who quit
- The factory doesn't try to hire more

#5

I chose a recovery rate of $.99/21$, a little worse than the 2018 flu's rate, over 21 weeks

I chose an infection rate of $41/6300$ because flu season peak is 3 months, I added 2 months for the start and fade out, I put that at 21 weeks. So Total sick
Total pop • 21 weeks.

See code: ends way too quick
need better a & B

Scratch:

2018 Influenza - according Wikipedia
citing the CDC

$$\begin{aligned} \text{Symptoms} - \text{deaths} &= 40948000 / 41000000 \\ 41,000,000 - 52,000 &= 11 \end{aligned}$$

CDC →

.99 Recovery rate

11 most... flu activity peaks Dec. to Feb

November → March 5 months, $\times 4 + 1$
21 weeks