E: Levelized cost

Sequence of **hypothetical identical annual cost**s having the same PV as a stream of **actual costs**

Example: annualized cost of an infrastructure project

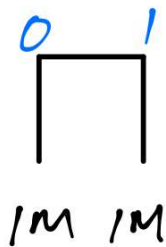Bridge with 20 lifespan
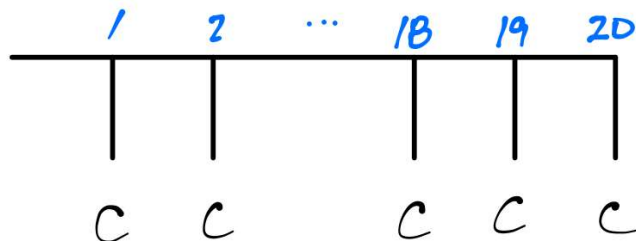Construction cost = $1M in years 0 and 1
Useful life = years 1-20
r = 10%

PV of actual cost:

0   1

1M 1M

$$PV_{actual} = \$1M + \frac{\$1M}{1.1} = \$1.909M$$

PV of levelized cost:

1   2   ...   18   19   20

C   C   C   C   C

level

20

$$PV_{level} = \frac{C}{r}\left(1 - \frac{1}{(1+r)^T}\right) = \frac{C}{0.1}\left(1 - \frac{1}{(1.1)^{20}}\right)$$

Solve for C that makes $PV_{level} = PV_{actual}$

$$\frac{C}{0.1}\left(1 - \frac{1}{(1.1)^{20}}\right) = 1.909M$$

$$\frac{C}{0.1} * 0.851 = 1.909M$$

$$C = \$224k$$

Typical use:

- Annual tolls needed to pay for building the bridge
- Annual benefits that would be needed for breakeven NPV

$$C = \frac{r * PV}{\left(1 - \frac{1}{(1+r)^T}\right)}$$

Exercise on GC