

Simple interest $P \cdot i \cdot n$ = total amount of interest

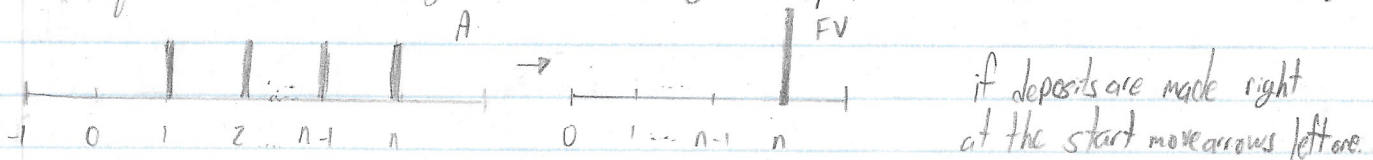
Compounding interest $FV = P(1 + \frac{i}{n})^k$
 i = annual interest n = # of periods
 n = periods per year

Effective interest rate = $(1 + \frac{i}{n})^k - 1$
 i = annual interest n = # of period in a year
 k = # of periods in new period

special annuity
 $P = A(\frac{P}{A}, i, N)$
 $P = \frac{A}{i}$, if $N \rightarrow \infty$

Continuously compounding effective annual = $[1 + \frac{i}{n}]^n - 1 = e^i - 1$, where $n \rightarrow \infty$
 Annuity (Uniform Series compound): $FV = \frac{A[(1+i)^n - 1]}{i}$
 i = interest rate per period, A = payment per period
 n = # of periods/deposits.

Sinking fund is an interest-bearing account which regular deposits are made into to accumulate interest.



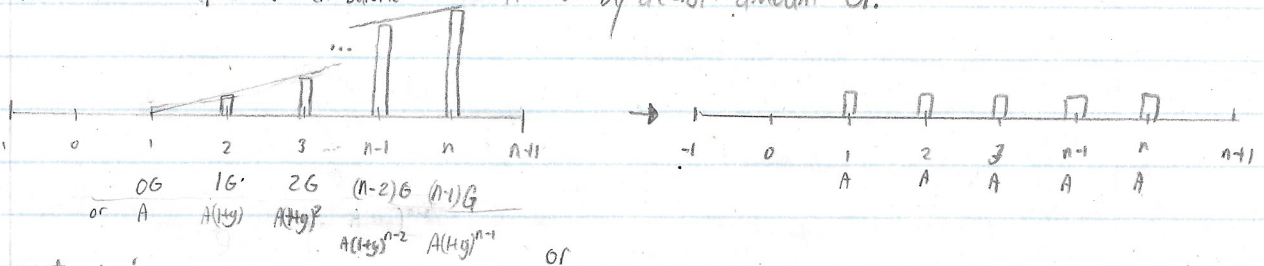
Capital Recovery Factor: $[\frac{A}{P}, i, N] = [\frac{A}{F}, i, N] [\frac{F}{P}, i, N] = \frac{i[(1+i)^N]}{(1+i)^N - 1}$

$(\frac{A}{F}, i, N)$ = Sinking fund factor (gives annuity)

APR = Annual Percentage Rate

Gradient A series of receipts or disbursements that increase by a const. amount G .

$G(\frac{A}{G}, i, N)$
 $G[\frac{i}{1+i} - \frac{N}{(1+i)^N - 1}] = A$



Growth Adjusted interest rate

$\tilde{i}^* = \frac{1+i}{1+g} - 1$ use PV annuity and divide by $(1+g)$

$g = i, \tilde{i}^* = 0$, use $PV = \frac{N \cdot A}{1+g}$

$\frac{G[(1+\tilde{i}^*)^n - 1]}{\tilde{i}^* [1+\tilde{i}^*]^n [1+g]} = PV$

filroy

Sustainable companies economic social environment

Mortgages like annuity

Amortization = # of years would to to repay mortgage given initial conditions.

Term = # of years the agreed upon interest rate is valid. [if it doesn't say it changes, use same i for entire amortization]

After a term, the Amortization period can change if i changes. Also @ this time, you can increase annuity payments and/or pay a lump sum.

Bonds

Paid Coupon twice a year. Coupon = face value \cdot rate $\frac{1}{2}$ Coupons are annuity every 6 months

Date repaying face value is maturity date.

Bonds are debt & stocks are equity

Stocks make you part owner (dividends) and can vote on stuff

Bonds have higher claim than assets than stocks. If bankrupt pays bonds then stocks

Bonds good because stock market can be volatile. Bond good for retirement. Bonds are short time horizons?

Usually bonds are safer than stocks but not all bonds are. Junk bonds are risky but offers higher payback

Bonds Government Treasury Bonds > 10yr, Treasury Note 1 to 10 yr, Treasury Bills [Tbills] < 1 yr. Government bonds safe in industrialized countries.

Corporate Short < 5yr, Intermediate 5 to 12 yrs, Long term > 12yr higher yield than Government b/c riskier. company credit determines the interest rate received.

* Par or face value is amount which the bonds can be redeemed for at maturity. Corporate bonds usually 1000 per bond

Actual price of bond different from face value except at redemption.

Usually coupons paid every 6 months. Maturity can be 1 day to 30yr or longer.

Longer maturity = higher interest rate. Long term bonds also fluctuate more. Short term are more predictable.

Assumption 1. Cost benefits are quantifiable in \$ 2. future cash flow are perfect estimates 3. Unaffected by inflation.

4. Sufficient funds 5. taxes are not applicable 6. Projects w/ first costs first cost is largest or equally largest cost.

Types of projects 1. Independent (does not affect others) 2. Mutually exclusive (only one)

3. Related but not mutually exclusive (related and affects)

Related projects 2^n sets (permutations) including null set (none).

yearly \rightarrow MARR minimum Acceptable Rate of Return interest rate required from a project for it to be accepted.

When comparing projects minimum cost, if equal total cost, pick one with lowest initial cost.

When comparing different lives compare over same life 3yr and 4yr use 12yr.

Study period means only allowed to do that one for period long

* Pay back period # of years for first cost to be recovered not including interest. includes all costs.