

EE-287 Engineering Economics

Lecture Title:

The concept of Equivalence and its Application in EE Scrutiny

Instructor:

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Equivalence?

In EE, when considered together, the Time Value of Money (TVM) and the Interest Rate (IR) help develop the concept of economic equivalence.

Meaning that **different sums of money at different times** would be equal in economic value

Example (**Backwards & Forwards Equivalence**)

If interest rate is 6% per year then Rs.100/- today is equivalent to Rs.94.33962264150943/- one year ago but also equivalent to Rs.106/- one year from today.

Rs.94.33962264150943/-
One year ago
Interest Rate 6%
How?
 $100/1.06 =$
Rs.94.33962264150943/-
(Backwards Equivalence)

Rs.100/- Today
Interest Rate 6%

Rs.106/- One year from today
Interest Rate 6%
How?
 $100 + 100(0.06) = \text{Rs.}106/-$
 $100 (1.06) = \text{Rs.}106/-$
(Forwards Equivalence)



Application of Equivalence as Verification tool

Explanation with an Example

A company makes auto-batteries available to a car manufacturer through privately owned distributorships. In general, batteries are stored throughout the year and a 5% cost increase is added each year to cover the inventory carrying charge for the distributorship owner. Assume you own the battery making company. **Make the necessary calculations to show which of the following statements are TRUE and which are FALSE about battery costs.**

(A) The amount of \$98 now is equivalent to a cost of \$105.60 one year from now

Forwards Equivalence Check (FEC):

Total amount Accrued = $98(1.05) = \$102.90 \neq \105.60 (**FALSE**)

Backwards Equivalence Check (BEC):

Required Original Cost = $105.60/1.05 = \$100.57 \neq \98 (**FALSE**)

(B) A truck battery cost of \$200 one year ago is equivalent \$205 now

Backwards Equivalence Check (BEC):

Required Old Cost = $205/1.05 = \$195.24 \neq \200 (**FALSE**)



Application of Equivalence as Verification tool

Example Continues

(C) A \$38 cost now is equivalent to \$39.90 one year from now

Forwards Equivalence Check (FEC):

The cost one year from now = $38(1.05) = \$39.90$ (TRUE)

(D) A \$3000 cost now is equivalent to \$2887.14 one year ago

Forwards Equivalence Check (FEC):

Cost now = $2887.14(1.05) = \$3031.50 \neq \3000 (FALSE)

(E) The carrying charge accumulated in 1 year on an investment of \$2000 worth of batteries is \$100

The charge is 5% per year so simply verify like: $\$2000(0.05) = \100 (TRUE)



Assignment No. 2

Do and submit the same example but with 35% of the 5% cost increase mentioned

Thank You for listening

