Definition 1

PRESENT VALUE. The present value at \( i \) per interest period of an amount \( S \) due in \( n \) interest periods is the sum \( P \) which, if invested now at the given rate, would amount to \( S \) after \( n \) interest periods. From Lecture 3,

\[ S = P(1 + i)^n \]

hence,

\[ P = S(1 + i)^{-n} \]

EXAMPLE 1

Find the present value of $2000 due in 6 years if money is worth 5\% compounded semiannually.

Solution:

\( S = $2000 \): the compound amount.

\( T = 6 \): the term in years.

\( f = 2 \): frequency of conversion: semiannually defines two (2) periods per year.

\( n = f \cdot T = 2 \cdot 6 = 12 \): periods in the term.

\( r = \frac{5}{100} = 0.05 \): the annual interest rate.

\( i = \frac{r}{f} = \frac{0.05}{2} = 0.025 \): the periodic interest rate

\[ P = S(1 + i)^{-n} = $2000(1 + 0.025)^{-12} = $1487.11 \]