

Interest

1 Preface

For the remainder of this paper, the following variables will be as set forth, unless specified otherwise.

A : Accumulated Amount (*Future Value*)

P : Principal (*Present Value*)

r : Nominal Interest Rate Per Year

m : Yearly Number of Conversion Periods

t : Term (Number of Years)

As well as...

i : Interest Rate Per Period

$$\frac{r}{m} \quad (1)$$

n : Total Number of Conversion Periods

$$m * t \quad (2)$$

2 Simple Interest

$$A = P(1 + rt) \quad (3)$$

3 Compound Interest

- Interest that is periodically added to the principal
- Earns interest on itself

$$A = P(1 + i)^n \quad (4)$$

4 Continuous Compounding Interest

$$A = Pe^{rt} \quad (5)$$

5 Effective Rate of Interest

The **effective rate of interest** is the **annual rate** which would yield the **same accumulated amount** as the **nominal rate** (r) compounded m times over the term (t). It can also be called the **annual percentage yield**.

$$r_{eff} = (1 + i)^m - 1 \quad (6)$$

where:

r_{eff} : Effective Rate of Interest

6 Present Value

6.1 Compound Interest

$$P = A(1 + i)^{-n} \quad (7)$$

6.2 Continuous Interest

$$P = Ae^{-rt} \quad (8)$$