

Internal rate of return: Suppose an initial investment of P dollars produces the returns

R_1 at the end of the first period

R_2 at the end of the second period

\vdots

R_N at the end of the N^{th} (and last) period.

Then the internal rate of return i , is obtained by solving the equation

$$P(1+i)^N + R_1(1+i)^{N-1} - R_2(1+i)^{N-2} - \dots - R_N = 0$$

for its positive root.

Here we are assuming that all the returns are non-negative and add up to at least P .

Mortgage: When a loan of P dollars is paid back with N equal periodic payments of R dollars at interest rate i per period, the equation to be solved for i becomes

$$P(1+i)^N - R(1+i)^{N-1} - R(1+i)^{N-2} - \dots - R = 0.$$

This equation can be simplified to

$$Pi + R[(1+i)^N - 1] = 0.$$
