## Formulas

### Net Operation Income(Noi)

* For first year or last year

$$Noi\_t = Sales Price\_{t-1} \* CapRate\_{t-1} \* TimeDiff\_{t} \space (t \in [2, 3, 4, ......, n])$$

* For years between the two sales(using cpi rate)

$$Noi\_t = Noi\_{t-1} \* (1 + CPI\space RATE\_{t}) \* TimeDiff\_{t})$$

* For years between two sales(using fixed average difference)

$$Noi\_t = Noi\_{t-1} + fixed\space average\space difference\_t \* TimeDiff\_{t})$$

### CPI Calculation

$$ CPI\space RATE\_{date1 -> date2} = CPI\_{date2} / CPI\_{date1} - 1 $$

### Average difference

$$Fixed\space Average\space Difference = \frac{Noi\_{n} - Noi\_{1}}{n - 1} $$

### Cash Flow(CF)

$$if\space t = 1 \space \space CF = - SalesPrice $$

$$if\space t = n \space \space CF = SalesPrice + SalesCost + Noi$$

$$else \space \space CF\_t= Noi\_t$$

### Internal Return Rate

Where + di = the ith, or last, payment date.

* d1 = the 0th payment date.
* Pi = the ith, or last, payment.