# Math 2FM3, Tutorial 10 

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## Dollar-Weighted Return For a One-Year Period

- A: balance in the fund at the start of the year;
- B: balance in the fund at the end of the year;
- $\mathrm{C}_{\mathrm{k}}$ : net deposit at time $\mathrm{t}_{\mathrm{k}}$.
- $i$ is effective annual rate, then
- $A(1+i)+C_{1}\left(1+\left(1-t_{1}\right) i\right)+\ldots+C_{n}\left(1+\left(1-t_{n}\right) i\right)=B$
- $\left(A+\Sigma C_{k}\right)+i\left(A+\Sigma C_{k}\left(1-t_{k}\right)\right)=B$
- $i=I /\left(A+\sum C_{k}\left(1-t_{k}\right)\right)$ and $I=B-\left(A+\sum C_{k}\right)$ is the net amount of interest.


## Time-Weighted Return For a One-year Period

- $F_{k}$ : the value of fund just before the net deposit $\mathrm{C}_{\mathrm{k}}$ at time $\mathrm{t}_{\mathrm{k}}$
- $F_{j} /\left(F_{j-1}+C_{j-1}\right)$ is the growth factor from $t_{j-1}$ to $t_{j}$
- $\mathrm{i}=\left(\mathrm{F}_{1} / \mathrm{A}\right)^{*}\left(\mathrm{~F}_{2} /\left(\mathrm{F}_{1}+\mathrm{C}_{1}\right)\right)^{*} \ldots *\left(\mathrm{~F}_{\mathrm{k}} /\left(\mathrm{F}_{\mathrm{k}-1}+\mathrm{C}_{\mathrm{k}-1}\right)\right)^{*}(\mathrm{~B}$ $\left./\left(F_{k}+C_{k}\right)\right)-1$


## Ex 5.2.3

- On January 1, 2005, an investment account is worth 100,000. On April 1, 2005, the value has increased to 103,000 and 8,000 is withdrawn. On January 1, 2007, the account is worth 103,992 . Assuming a dollar-weighted method for 2005 and a time-weighted method for 2006, the effective annual interest rate was equal to x for both 2005 and 2006. Calculate x .


## Ex 5.2.6

- You are given the following information about the activity in two different investment accounts:
- Date Value(before) Deposit Withdrawal
- K account:
- 1/1/99 100.0
- 7/1/99 125.0
x
- 10/1/99 110.0 2X
- 12/31/99 125.0
- L account:
- 1/1/99 100.0
- 7/1/99 125.0 X
- 12/31/99 105.8
- During 1999, the dollar weighted return for investment Account K equals the time weighted return for investment Account L , which equals to i . Calculate i.

