1/15/20

No class on Thursday, Jan. 16

No class on Tuesday, Jan. 21

Watch the youtube videos and work problems!

T-Bill Example: (See next page)
Treasury Bills Example

Two 180-day T-Bills, one Canadian and one U.S., each have a redemption value of 100,000. Both T-Bills have the same numeric quoted rate. The Canadian T-Bill sells for 126.13 more than the U.S. T-Bill. Determine the price of the Canadian T-Bill.

(A) 96750
(B) 96875
(C) 97000
(D) 97125
(E) 97250

\[ \text{Can. quoted rate} = \dot{i} - \text{simple interest} \]
\[ C = P \cdot (1 + \dot{i} \cdot \frac{180}{365}) \]

\[ \text{U.S. quoted rate} = d - \text{simple discount} \]
\[ P = C \cdot (1 - d \cdot \frac{180}{360}) \]

\[ i = d \]

\[ \text{Can.} : \quad P = 100\,000 \left( 1 + \frac{180\,i}{365} \right) \]

\[ \text{U.S.} : \quad P = 100\,000 \left( 1 - .5\,i \right) \]

\[ 100\,000 \left( 1 - .5\,i \right) = \frac{100\,000}{\left( 1 + \frac{180\,i}{365} \right)} - 126.13 \]

**quadratic in i ... i = 0.06**

\[ \therefore \text{answer} \quad P = 100\,000 \left( 1 + \frac{180\,(0.06)}{365} \right)^{-1} = 97\,126.13 \]

(on FM Exam, we could use guess & check)

see next page
**Guess & Check**

<table>
<thead>
<tr>
<th>Plan</th>
<th>$i = d$</th>
<th>$P_{us}$</th>
<th>$\Delta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>96750</td>
<td>0.068...</td>
<td>96594</td>
<td>156</td>
</tr>
<tr>
<td>96875</td>
<td>0.065...</td>
<td>96729</td>
<td>146</td>
</tr>
</tbody>
</table>
M154: General Force of Interest

Notation: $S_t$

\[
paf_k^n = e^{\int S_t^t S_t dt}
\]

\[
\hat{a}(t) = paf_0^t = e^{\int S_0^t \Delta r dr}
\]

Special Case Examples

\[
S_t = \frac{2t}{t^2 + 6} \implies \hat{a}(t) = \frac{t^2 + 6}{6}
\]