HW 6

4.3) 1) $\ddot{s}^{(4)}_{\overline{23}|\,2.25\%} = \dfrac{(1+.0225)^{23}-1}{4[(1+.0225)^{.25}-1]}(1+.0225)^{.25}$

$= \underline{30.11566}$

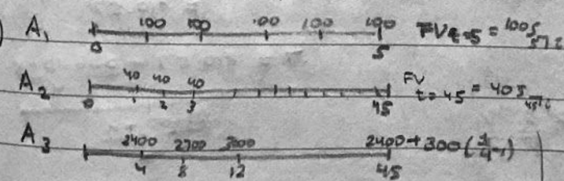
$a^{(12)}_{\overline{\infty}|\,4\%} = \dfrac{1}{i^{(12)}} = \dfrac{1}{i^{(4)}-12[(1+i)^{1/12}-1]}$

$\Rightarrow \dfrac{1}{.0392849}$

$= \underline{25.45509}$

- $\ddot{s}^{(4)}_{\overline{23}|}$ shows accum. value at end of 23 interest periods of an annuity w/ a payment of 1/4 at beginning of each quarter of an interest period
- $a^{(12)}_{\overline{\infty}|}$ shows present value of a perpetuity with payment $\frac{1}{12}$ @ end of each 12th of an interest period

4.4) 2)



$2400\dfrac{s_{\overline{45}|i}}{s_{\overline{4}|i}} + \dfrac{300}{i s_{\overline{4}|i}}\left[\dfrac{s_{\overline{45}|i}}{s_{\overline{4}|i}} - \dfrac{45}{4}\right]$

$933.52 = 100\dfrac{(1+i)^5-1}{i}$

$1+9.3352i = (1+i)^5$

$= \dfrac{\ln(1+9.3352i)}{\ln(1+i)}$

$\Rightarrow \dfrac{160806.60}{s_{\overline{4}|i}} + \dfrac{1}{i s_{\overline{4}|i}}\left(\dfrac{20000.825}{a_{\overline{4}|i}} - \dfrac{\ln(1+9.332i)}{\ln(1+i)}\right)$

4.5) 6) $(1+j)^{12} = 1.0728$

$j = .0058731$

$s_{\overline{12}|j} = 12.39532$

$1000 s_{\overline{12}|j} = 12395.32$

$i \Rightarrow 395.32$

$12000 \times .228 + 1000 s_{\overline{12}|j} - 12000$

$P_t = 12000(t-1)i + 395.32$

$395.32 \times s_{\overline{8}|\,4\%} + 12000 \times .0728\,(Is)_{\overline{7}|\,4\%}$

$(23261)(1.04)^2 + (96000)(.728)(1.04)$

$+ 96000(.7)$

$= 25159.10 + 14268.35 + 6988.8$

$\Rightarrow \boxed{142879.58}$ 96000 +

4.7) 3) $12[(1+.054)^{1/12}-1] = 5.27\% \to \frac{5.27}{12} \Rightarrow .4392\%$ per month

Yr 1) $100[(1+.004392)^{12}-1 / .004392] = 1229.42$

Yr 2) $1200(1+.004392)^{12} + 1229.42 = 2494.22$

Yr 3) $2400(1+.004392)^{12} + 1229.42 = 3759.02$

Yr 4) $3600(1+.004392)^{12} + 1229.42 = 5023.82$

Yr 5) $4800(1+.004392)^{12} + 1229.42 = 6288.62$

Yr 6) $6000(1+.004392)^{12} + 1229.42 = 6324$

Yr 7) $6000(1+.004392)^{12} + 1229.42 = 6324$

Yr 8) $6000(1+.004392)^{12} + 1229.42 = 6324$

$29.42(1.01)^{28} + 94.22(1.01)^{24} + 159.02(1.01)^{20}$

$+ 223.82(1.01)^{16} + 288.62(1.01)^{12}$

$+ 324(1.01)^{8} + 324(1.01)^{4} + 324(1.01)^{0}$

$= 1985.21$

$6000 + 1985.21$

$= 7985.21$

As a result, yield rate is: 5.242%.

Bond 1)

6.2) 4) $$\frac{2000\left(\frac{.1}{2}\right) + \frac{2000-2318.63}{n}}{\frac{2000+2318.63}{2}}$$

$$= \frac{100 - \frac{318.63}{n}}{\frac{4318.63}{2}} = \frac{100 - \frac{318.63}{n}}{2159.31}$$

Bond 2)

$$\frac{\left(2000 \times \frac{.11}{2}\right) + \frac{2000-2531.05}{n}}{\frac{2000+2531.05}{2}}$$

$$= \frac{110 - \frac{531.05}{n}}{2265.52}$$

$$\frac{100 - \frac{318.63}{n}}{2159.31} = \frac{110 - \frac{531.05}{n}}{2265.52}$$

$$\frac{110n - 531.05}{100n - 318.63} = \frac{2265.52}{2159.31}$$

$$110n - 531.05 = 104.9187n - 334.30$$

$$n = 28$$

$$\frac{1 - .097215}{21.242} = 4.25\% \Rightarrow 8.5\%$$
$$\times 2$$

6.2) 7) Instructor said to skip

6.3) 2) $.11\left(\frac{2000}{2}\right) = 110$

$$\frac{110}{2.6\%}\left(1 - \frac{1}{1.026^{20}}\right) = 1698.72$$

$$x - 83.28 = 1698.72 + \frac{x}{1.026^{20}}$$

$$x = \frac{1698.72 + 83.28}{\left(1 - \frac{1}{1.026^{20}}\right)}$$

$$\Rightarrow 4438.18$$

6.4) 2) $$\sum_{t=1}^{14} \frac{806.09}{(1+.07)^t} + \frac{22600}{(1+.07)^{14}}$$

$$806.09 \times 8.74 + 22600 \times .84$$

$$= 15814.29$$

$$.6 = \frac{\text{Annual Int} + \frac{22600 - 18480}{14}}{\frac{22600+18480}{2}}$$

$$= 810.57$$

$$.7 = \frac{810.57 + \frac{22600 - x}{14}}{\frac{22600 + x}{2}}$$

$$.10642x = 1623.86$$

$$\Rightarrow 15184.29$$

3) $45\, a_{\overline{n}|.015} + 2000v^n = 45\, a_{\overline{2n}|.015} + 2000v^{n} - 233.02$

$$1000v^{2n} - 1000v^n + 233.02 = 0$$

$$v^{2n} - v^n + \frac{233.02}{1000} = 0$$

$$v^n = \frac{1 \pm 0.2606}{2}$$

$$v^n = .6303 \qquad v^n = .3697$$

$$n = \frac{\ln(.6303)}{\ln(.9852)}$$

$$n = 30.955$$

$$\boxed{n = 31}$$