

# ELEC 481 Homework 6

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**Question 1a.**

$$i^{30} = \frac{130000}{70000} \implies i = 2.1\%.$$

**Question 1b.**

$$(1+i)^{30} = (1+i' + f + i'f)^{30} = \frac{130000}{70000} \implies i' = -0.1\%.$$

**Question 1c.**

$$F = P \cdot (1+f)^{30} = \$134470.$$

**Question 2.** The present value of the costs can be seen in figure 1 (their NPW is the negative of the SUM result at the bottom). As can be seen the Duro option has a lower cost so should be chosen.

**Question 3a.** See the revenue stream in figure 2. Using the excel IRR function we find the interest rate is 56.2%.

**Question 3b.** Adjusting this rate we get:

$$i' = \frac{i-f}{1+f} = 48.5\%.$$

**Question 4a.**

$$F = 10000 \cdot 1.044^{15} = \$19077.$$

**Question 4b.** Five years away value:

$$F = 10000 \cdot \left(\frac{0.044 - 0.052}{1.052} + 1\right)^5 = \$9626.$$

After 10 years:

$$F = 9626 \cdot \left(\frac{0.044 - 0.035}{1.035} + 1\right)^5 = \$10051.$$

At the end:

$$F = 10051 \cdot \left(\frac{0.044 - 0.031}{1.031} + 1\right)^5 = \$10701.$$

**Question 4c.**

$$i' = \sqrt[15]{\frac{10701}{10000}} = 0.5\%.$$

Year	Cost Filterco (\$)	Cost Duro (\$)
0	6700.00	15000.00
1	1047.62	952.38
2	1037.64	943.31
3	1027.76	934.33
4	1017.97	925.43
5	8371.15	916.61
6	998.67	907.89
7	989.16	899.24
8	979.74	890.67
9	970.41	882.19
10	961.17	566.83
SUM	24101	23819

Figure 1: NPW of the costs for the two options for question 2.

Year	In	Out	Sum
0			0
1		-12000	-12000
2		-12000	-12000
3	60000	-12000	48000

Figure 2: Revenue stream for question 3