PGSS: Math Finance HW 5

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1. (a)

$$\frac{1000}{(1+\frac{r(0,1)}{12})^{12}} = \frac{1000}{(1+\frac{0.03}{12})^{12}}$$
$$\frac{1000}{(1+\frac{0.03}{12})^{12}} = 970.48$$
$$\frac{1000}{(1+\frac{0.03}{12})^{11}} = 972.91$$

Increased

(b)

$$\frac{5000}{(1+\frac{r(0,5)}{12})^{12\cdot 5}} = \frac{5000}{(1+\frac{0.04}{12})^{60}}$$
$$\frac{5000}{(1+\frac{0.04}{12})^{60}} = 4095.02$$
$$\frac{5000}{(1+\frac{0.041}{12})^{59}} = 4088.58$$

Decreased

2.

$$f(s,T) = 12\left(\left[\frac{(1+\frac{r(0,T)}{12})^T}{(1+\frac{r(0,s)}{12})^s}\right]^{\frac{1}{T-s}} - 1\right)$$

$$f\left(\frac{1}{2},2\right) = 12\left(\left[\frac{\left(1+\frac{r(0,2)}{12}\right)^2}{\left(1+\frac{r\left(0,\frac{1}{2}\right)}{12}\right)^{\frac{1}{2}}}\right]^{\frac{1}{\frac{3}{2}}} - 1\right)$$

$$f\left(\frac{1}{2},2\right) = 12\left(\left[\frac{(1+\frac{0.045}{12})^2}{\sqrt{1+\frac{0.02}{12}}}\right]^{\frac{2}{3}} - 1\right)$$

$$f\left(\frac{1}{2},2\right) = 12(0.0044454069)$$

$$f\left(\frac{1}{2},2\right) = 0.0533448828$$

$$f\left(\frac{1}{2},2\right) \approx 0.05334 \text{ or } 5.334\%$$