$$\frac{dF}{da}=\frac{1}{F}\left[\left(-2\mu_1 a+\frac{1}{2}\alpha_2 a^3\right)\left(-\frac{\mu_1}{2}+\frac{3}{8}\alpha_2 a^2\right)+\left(-4\sigma a+\alpha_1 a^3\right)\left(-\sigma+\frac{3}{4}\alpha_1 a^2\right)\right]$$

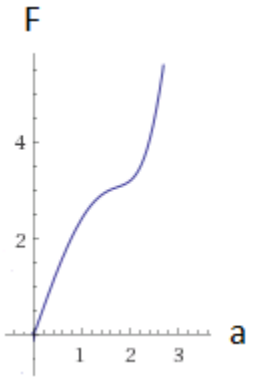
$$\frac{dF}{d\sigma}=\frac{a}{F}\left(-4\sigma a+\alpha_1 a^3\right)$$

$$\frac{dF}{d\alpha_1}=-\frac{a^3}{F}\left(-\sigma a+\frac{1}{4}\alpha_1 a^3\right)$$

$$\frac{dF}{d\mu_1}=\frac{a}{F}\left(-\mu_1 a+\frac{1}{4}\alpha_2 a^3\right)$$

The graph of the equation $\frac{1}{4}F^2=\left[-\frac{\mu_1}{2}a+\frac{1}{8}\alpha_2 a^3\right]^2+\left[-\sigma a+\frac{2}{8}\alpha_1 a^3\right]^2$

The below graph shows the smallest value for alpha $(\alpha_2=0.4)$ separately



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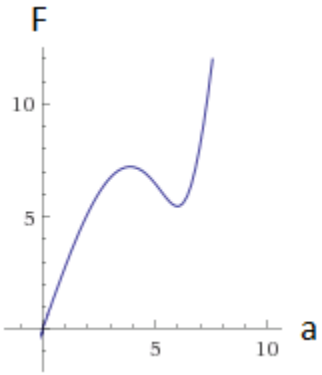
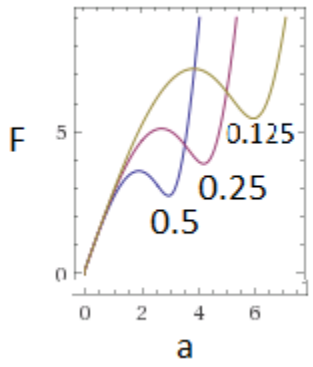
The below graph shows the smallest values for alpha $(\alpha_1=\alpha_2=0.125)$ separately



The below graph combines all of the values for alpha



the blue curve represents the graph when $\alpha_2 = 0.5$, $\mu_1 = 2$, $\sigma = 1$, $\alpha_1 = 0.5$

the red curve represents the graph when $\alpha_2 = 0.25$, $\mu_1 = 2$, $\sigma = 1$, $\alpha_1 = 0.25$

and the green curve represents the graph when $\alpha_2 = 0.125$, $\mu_1 = 2$, $\sigma = 1$, $\alpha_1 = 0.125$