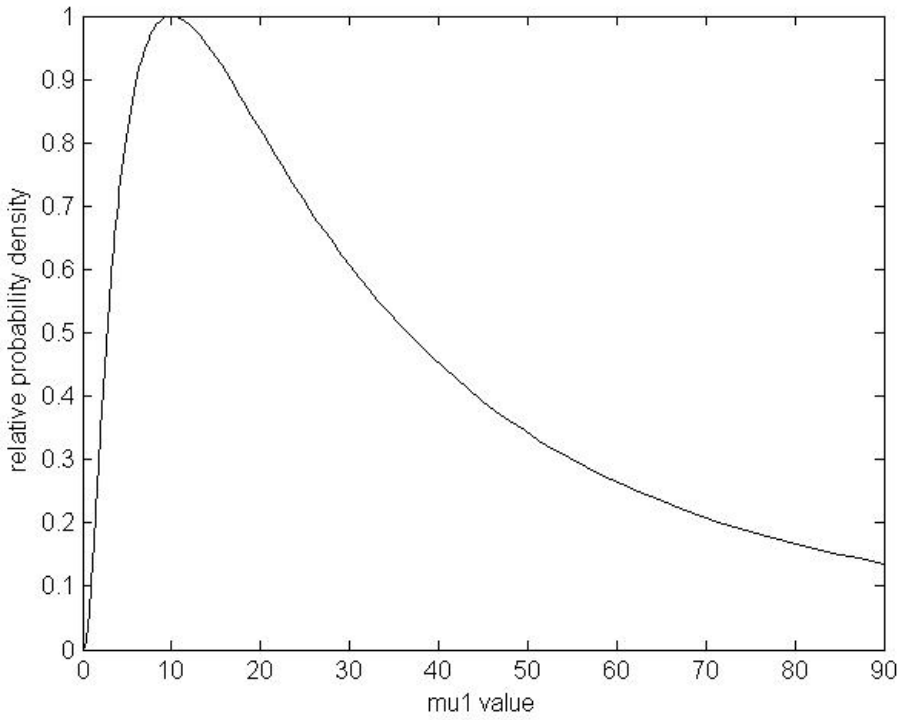

Figure 1a. P(μ_1), my assumed prior relative PDF for diamond mass #1. The distribution is lognormal around 10g, +/- 300% (I was hoping this'd be representative of the given 10 +/- 20g prior, even if it's not the exact distribution shape expected).

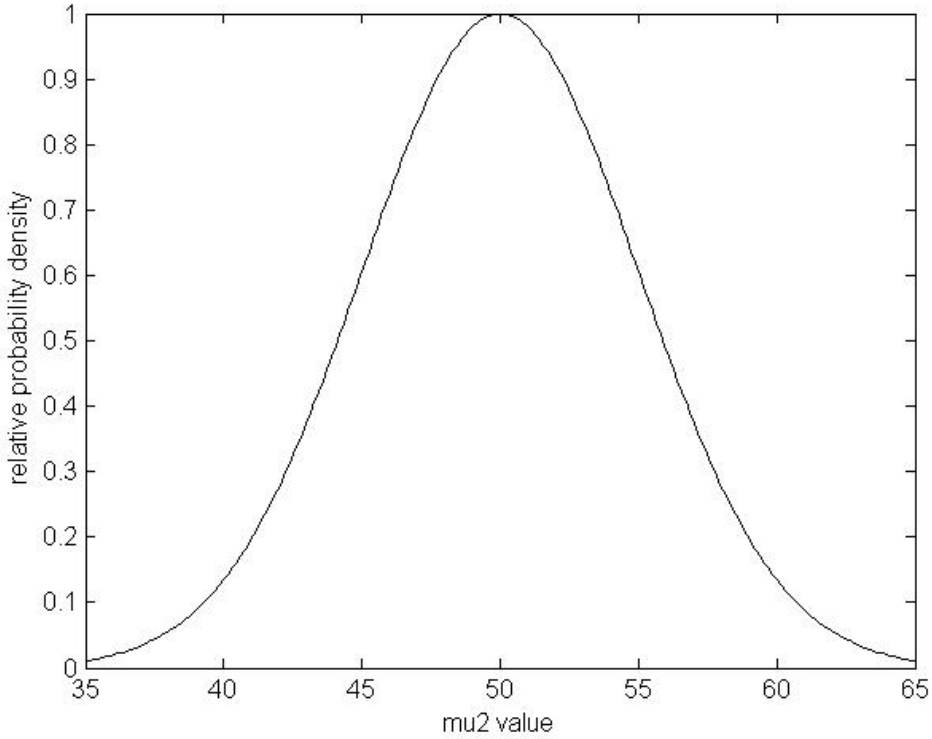

Figure 1b. P(μ_2), my assumed prior relative PDF for diamond mass #2. The distribution is normal around 50g, +/- 5g.

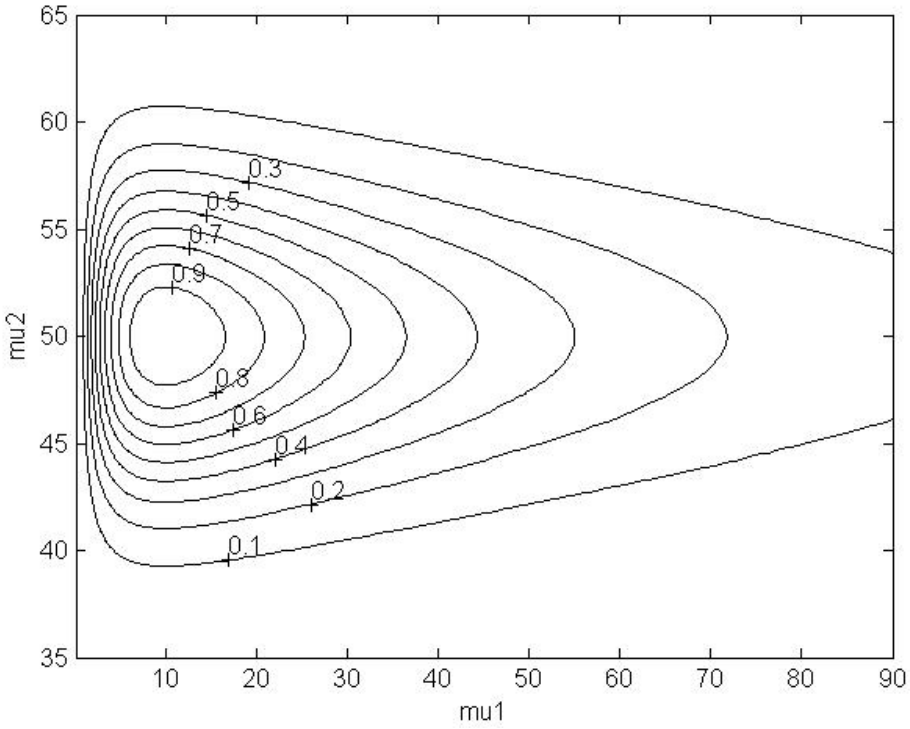

Figure 1c. Contours of the prior joint distribution P($\boldsymbol{\mu}$), which I got by assuming the prior distributions for the two masses were independent and then multiplying them together on a 2-D meshgrid() of points.

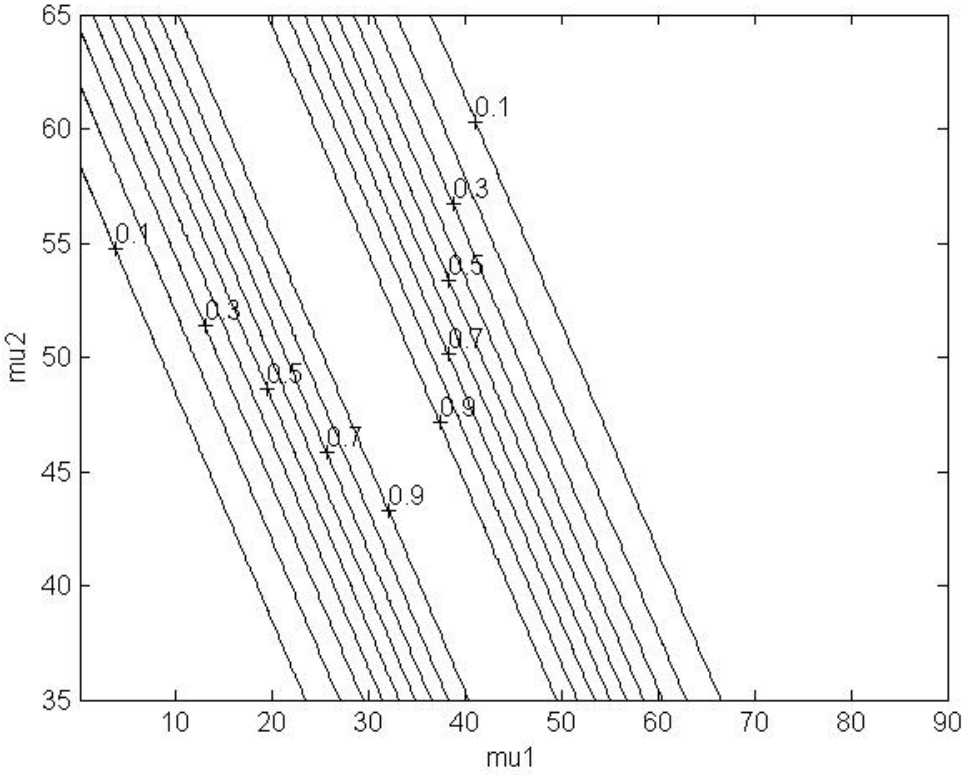

Figure 1d. Contours of the likelihood function $f(d|\boldsymbol{\mu})$, evaluated on a meshgrid() of points.

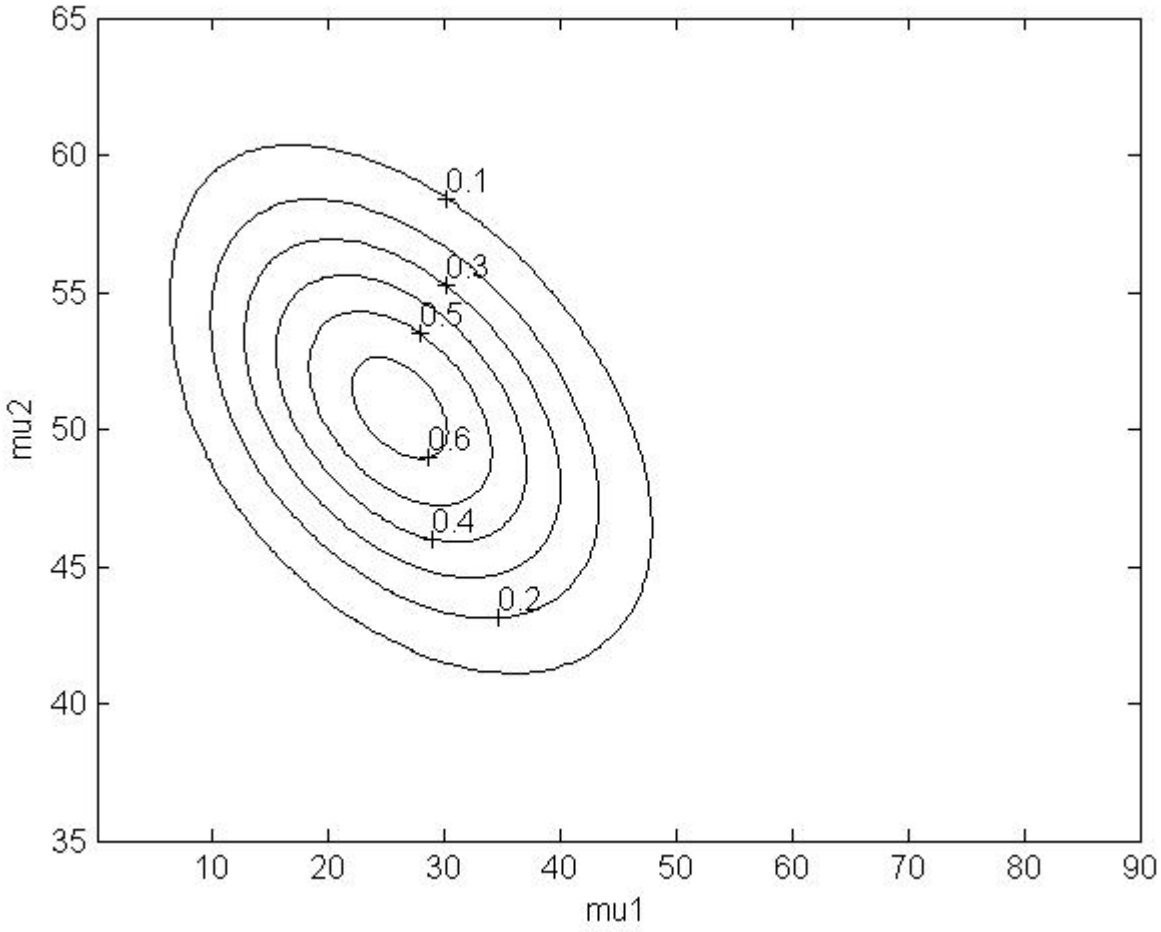

Figure 1e. Contours of the relative posterior distribution $q(\boldsymbol{\mu}|d)$ for problem 1, obtained via Bayes' theorem.

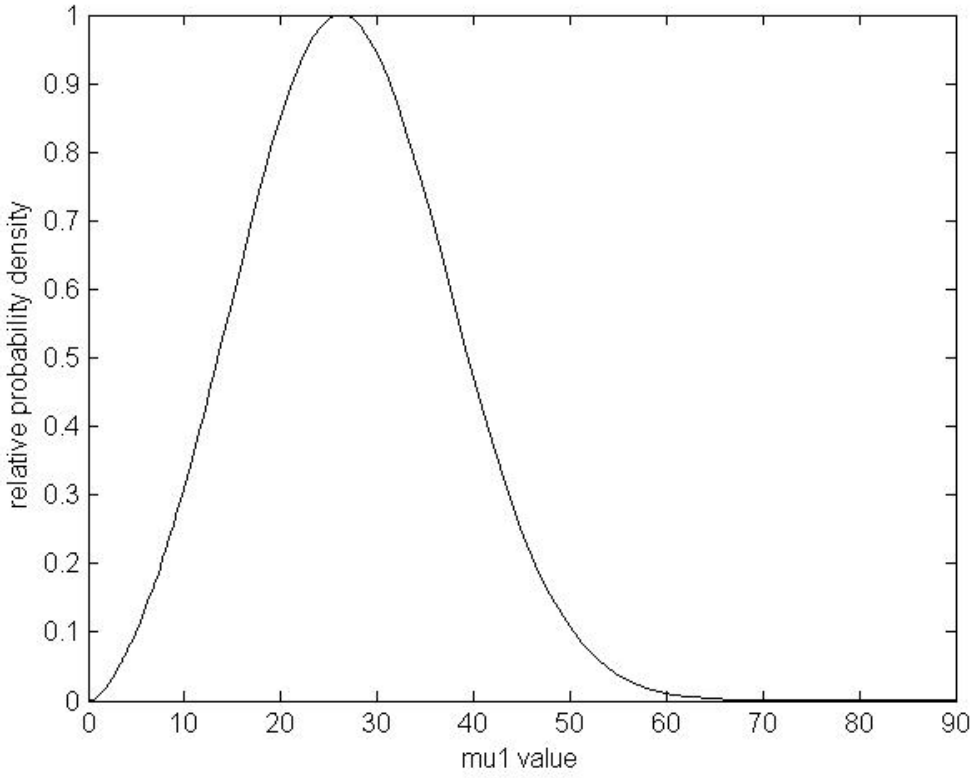

Figure 1f. Approximate ***posterior*** distribution P(μ_1) for problem 1, via Riemann sums of $q(\boldsymbol{\mu}|d)$ along the μ_2 axis.

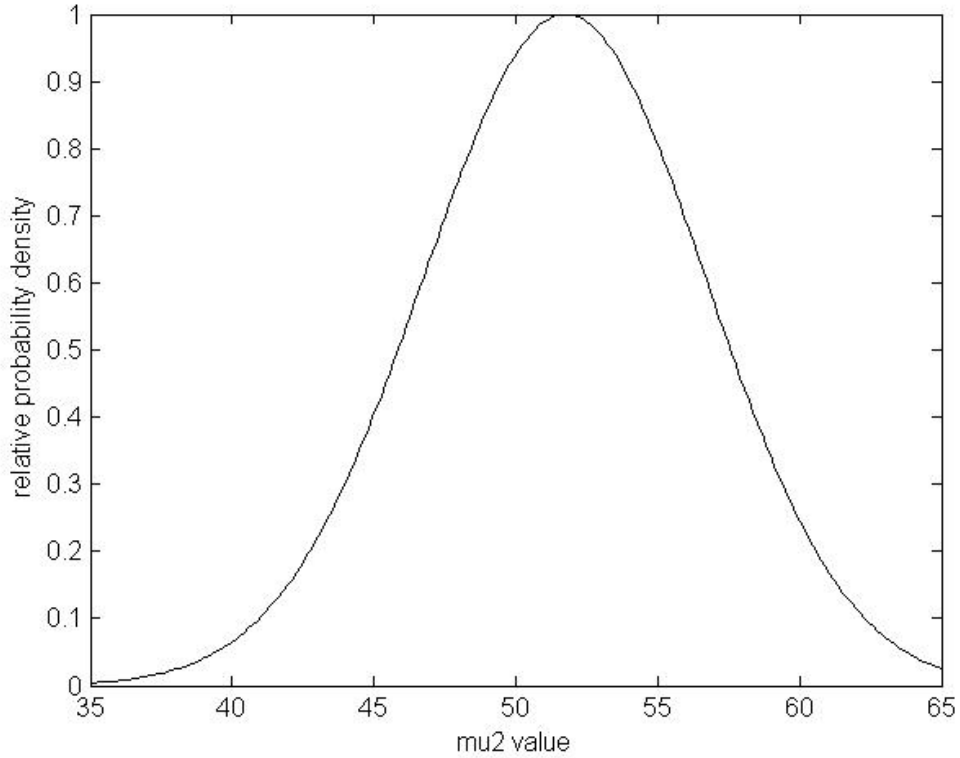

Figure 1g. Approximate ***posterior*** distribution P(μ_2) for problem 1, via Riemann sums of $q(\boldsymbol{\mu}|d)$ along the μ_1 axis.

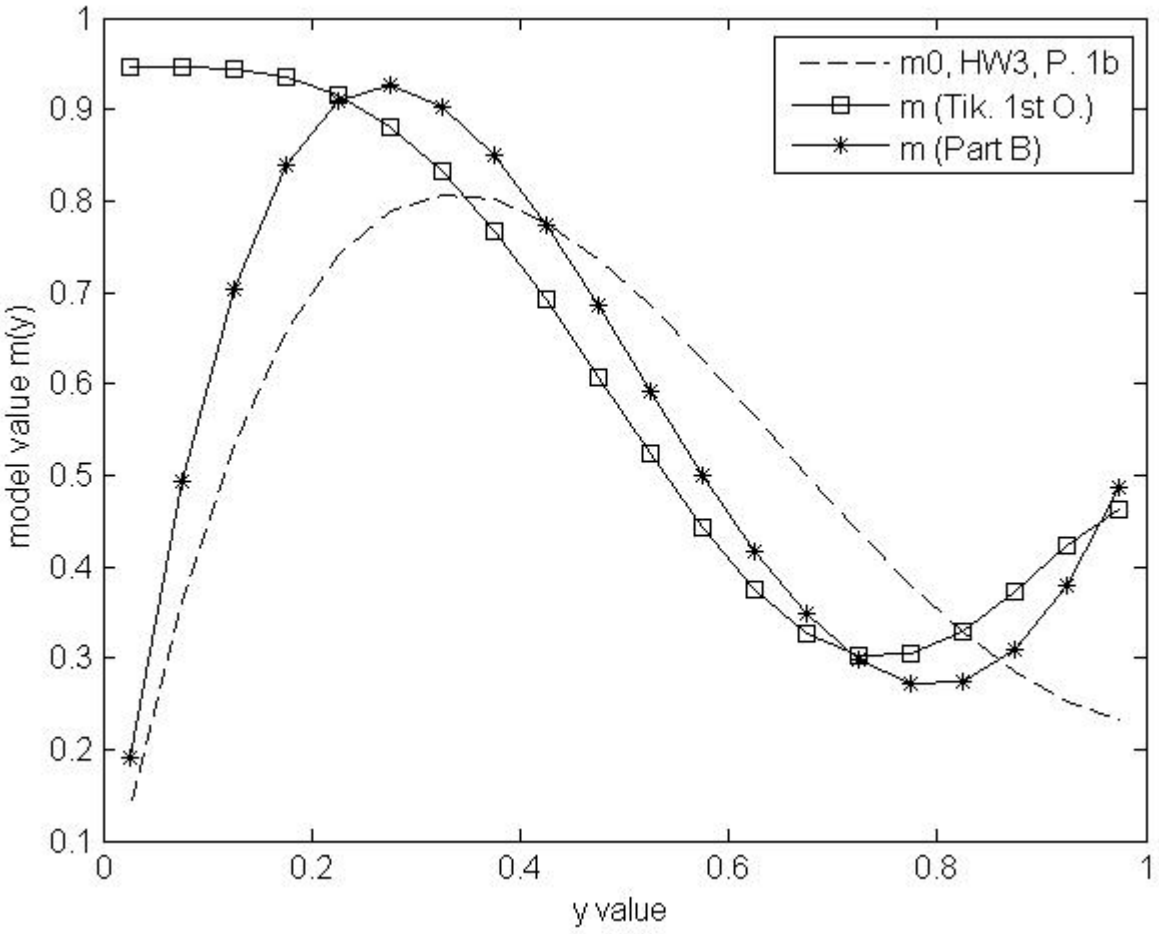

Figure 2a. Prior assumption m_0, Tikhonov (1st order) solution, and Bayes/Kalman solution (shown as m(Part B) above) reproduced from HW3. These, especially the above Bayes solution, will be used for qualitative analysis of sensitivity of the Bayes solution to perturbation.

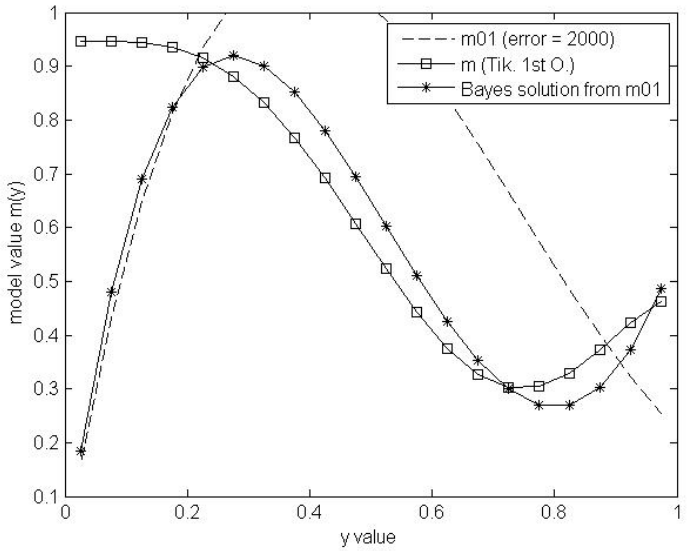

Fig 2b. Bayes solution; smoothly-perturbed $m_{0,1}$; prior (m_0) error = 2000

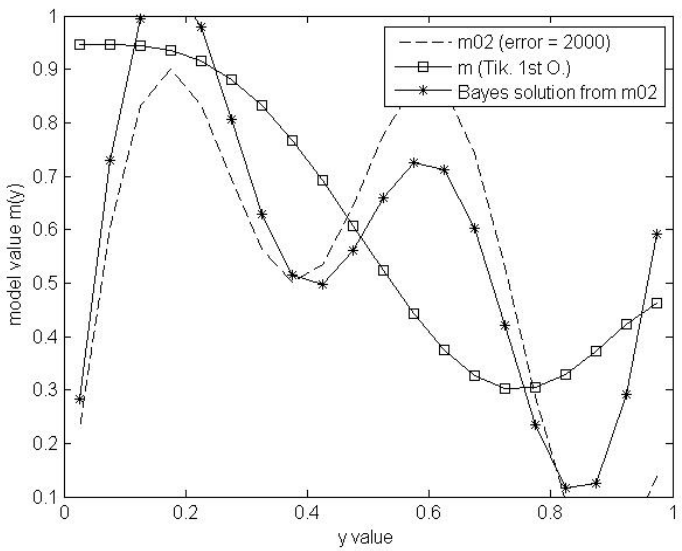

Fig 2c. Bayes solution; oscillation-perturbed $m_{0,2}$; prior (m_0) error = 2000

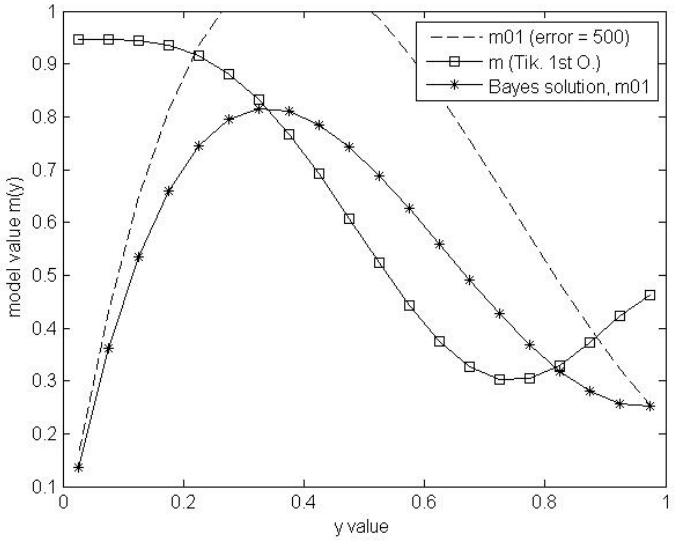

Fig 2d. Bayes solution; smoothly-perturbed $m_{0,1}$; prior ($m_{0,1}$) error = 500

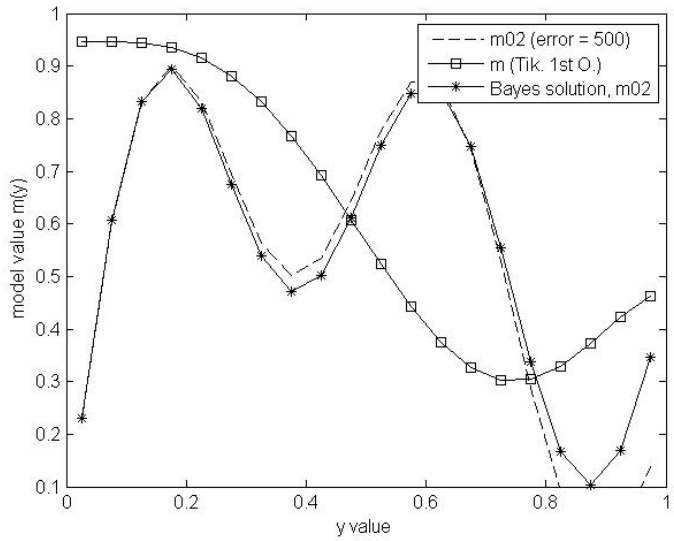

Fig 2e. Bayes solution; oscillation-perturbed $m_{0,2}$; prior ($m_{0,2}$) error = 500

Figures 2b-e. Figures **2b** and **2d** show the relatively low sensitivity of the Bayes solution to a very smooth perturbation in prior model $m_{0,1}$ (**2b**) and its associated prior uncertainty (**2d**), while Figures **2c** and **2e** show significant sensitivity to a more oscillatory perturbation in prior model $m_{0,2}$ (**2c**) and its associated uncertainty (**2e**).

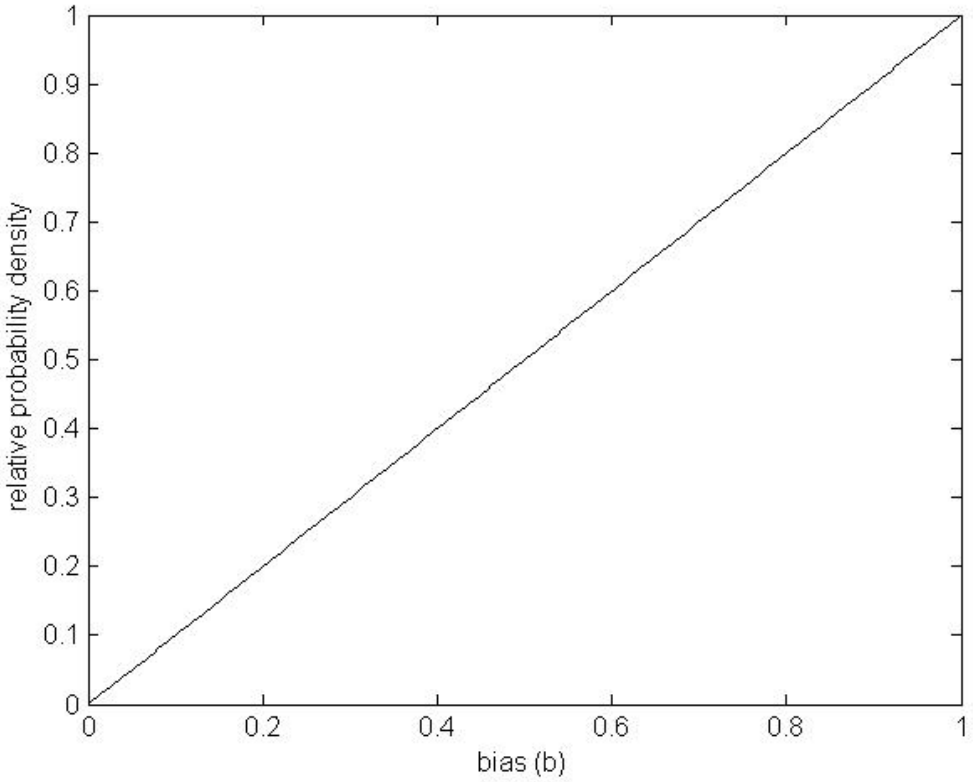

Fig 3a. Relative posterior PDF $q(b|d_1 = 0)$ (proportional to $f(d_1 = 0|b)$ given our uninformative prior).

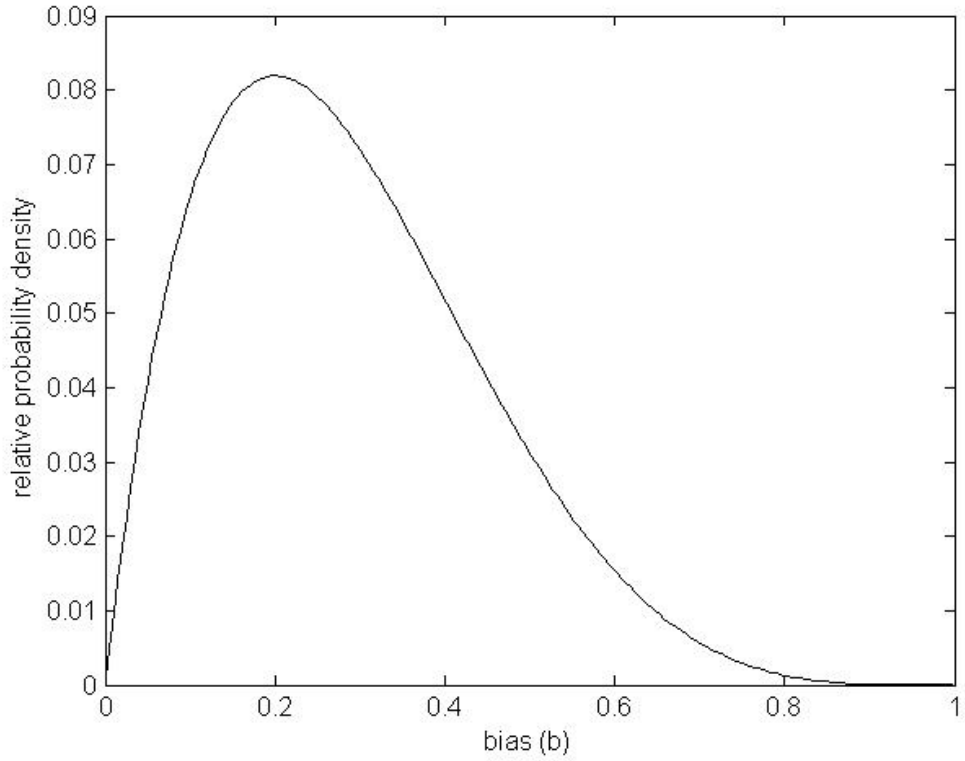

Fig 3b. Relative posterior PDF $q(b|d_1 = 0, d_{2,3,4,5} = 1)$.

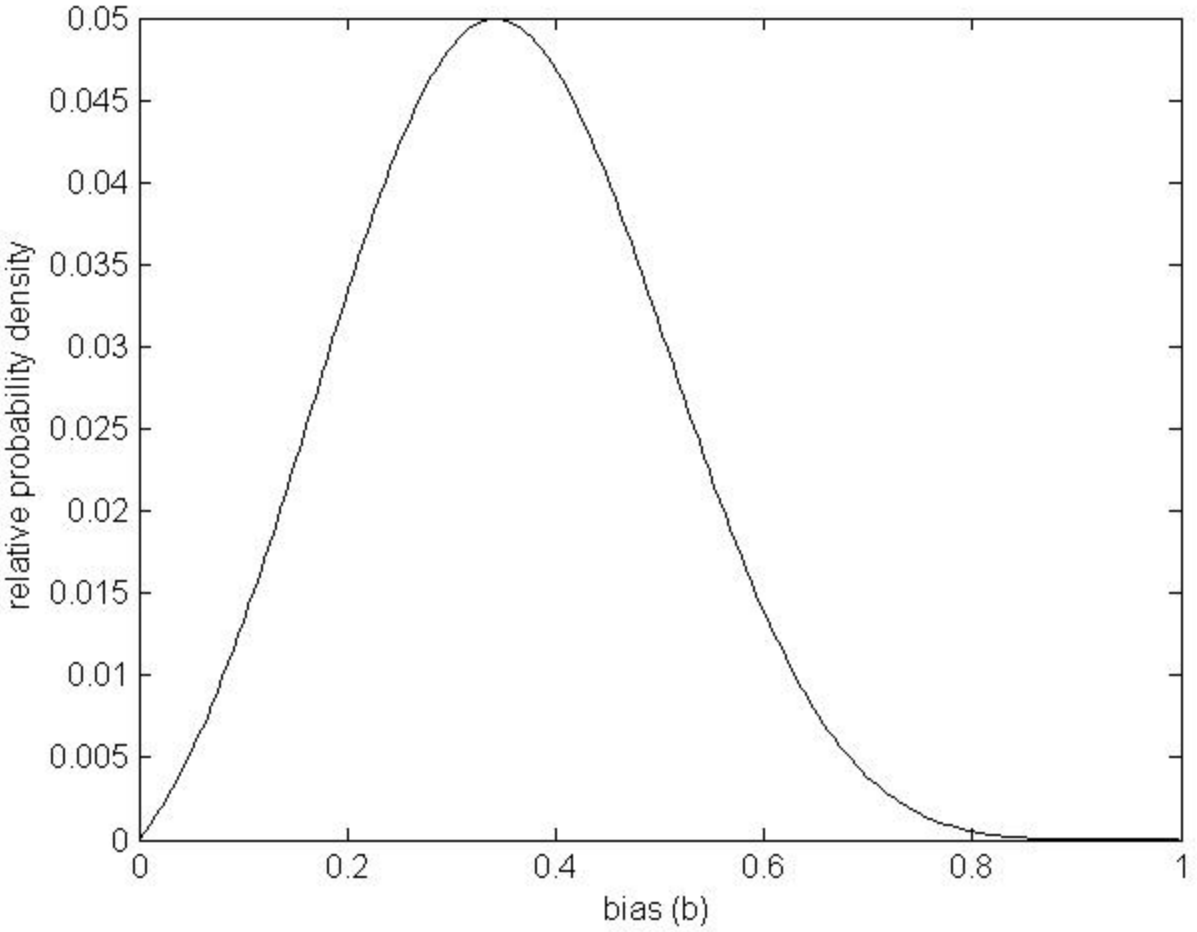

Fig 3c. Relative posterior PDF $q(b|d_1 = 0, d_{2,3,4,5} = 1)$, given the prior P(b) from problem 3, part e.