

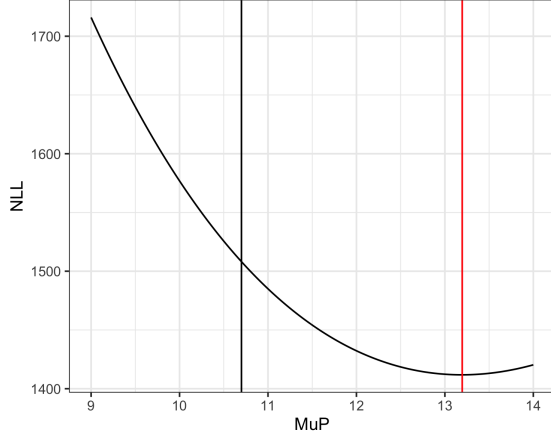
# June 24, 2021 Meeting Agenda

June 23, 2021

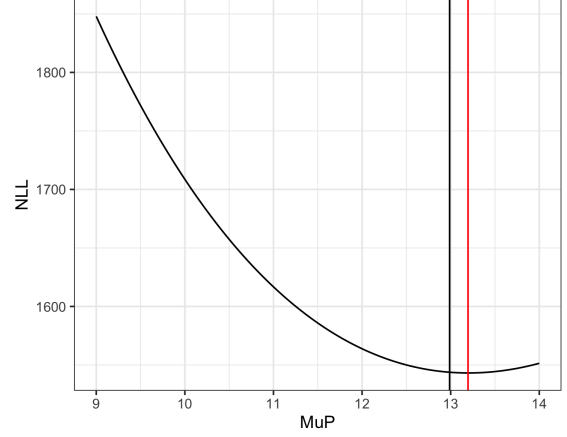
## 1 Joint estimation of $\mu_p$ and $\mu_t$ , Ad-hoc algorithm

### 1.1 Key Points

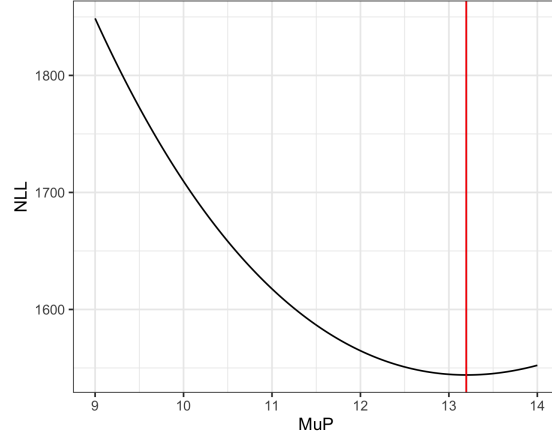
- The ad-hoc algorithm appears to be insensitive to initial parameters. I varied the initial values of both  $\mu_p$  and  $\mu_t$ , regardless of the initial values, it converged to  $\mu_p = 13.2$  and  $\mu_t = 0.065$ .
- Including all judges in our estimation of  $\mu_t$  reduced our estimate of  $\mu_t$  from 0.08 to 0.065. Table 1 shows how the values of  $\mu_p$  and  $\mu_t$  evolve during the algorithm.
- I redid the Negative log likelihood vs  $\mu_p$  plot, plotting both the optimal value of  $\mu_p$  we get using brute force, and the value we get from the optimizer. The plots are in Figure 1.



(a) Initial Value



(b) Iteration 1



(c) Iteration 2

Figure 1: Negative log likelihood vs  $\mu_p$ , the brute force optimizer is the red line

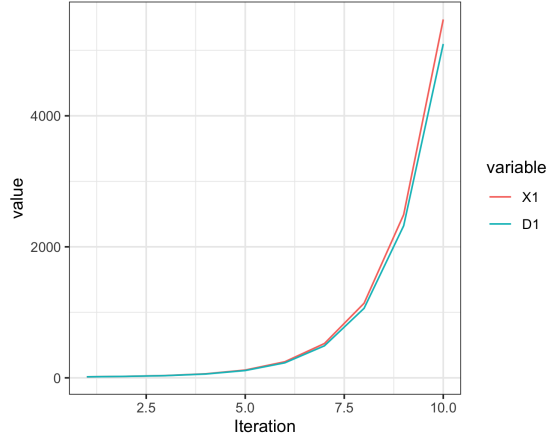
Table 1: Evolution of  $\mu_p$  and  $\mu_t$

MuP	MuT	Iteration
10.700	0.140	0
12.988	0.066	1
13.197	0.065	2
13.201	0.065	3

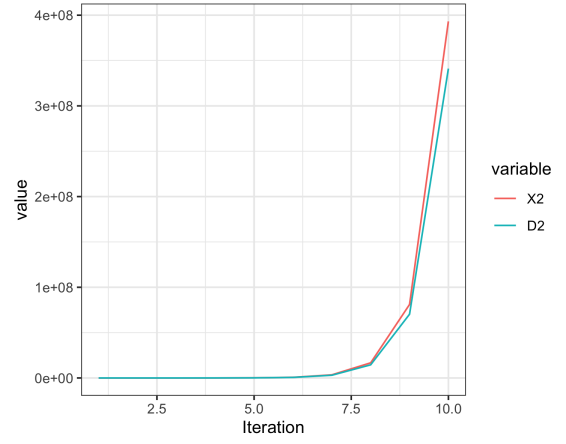
## 2 Gaussian EM Algorithm

### 2.1 Key Points

- I plotted the mean value of  $X_1^i, X_2^i, D_1^i, D_2^i$  in each iteration of the EM algorithm, the figure is below.



(a) Mean value of  $X_1^i, D_1^i$



(b) Mean value of  $X_2^i, D_2^i$

Figure 2: Mean values of  $X_1^i, X_2^i, D_1^i, D_2^i$  in each iteration