Main Figures

$$f_X(x;\mu,\sigma) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}(\frac{x-\mu}{\sigma})^2} \tag{1}$$

$$F_X(b) = P(X \leq b) = \int_{-\infty}^{b} f_X(x;\mu,\sigma)dx \tag{2}$$

$$X \sim \mathcal{N}(\mu,\sigma) \tag{3}$$

$$A \sim \mathcal{N}(\mu_A,\sigma_A) \tag{4}$$

$$T \sim \mathcal{N}(\tau,\sigma_\tau) \tag{5}$$

$$\mathbb{1}_{a<t} = \begin{cases} 1, & \text{if } a < t,\ \forall a,t \in \mathbb{R}; \\ 0, & \text{otherwise.} \end{cases} \tag{6}$$

$$\mu_A = \mathbb{E}[A] = \int_{-\infty}^{\infty} a \cdot f_A(a)da \tag{7}$$

$$\mu_{A_{react}} = \frac{\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} a \cdot f_A(a) \cdot f_T(t) \cdot \mathbb{1}_{a\in S}\ dxdt}{P(A<T)} \tag{8}$$

$$\sigma^2_{A_{react}} = \frac{\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} (a-\mu_{A_{react}})^2 \cdot f_A(a) \cdot f_T(t) \cdot \mathbb{1}_{a<t}\ da\ dt}{P(A<T)} \tag{9}$$

$$\mu_{mo_{react}} = \mu_{A_{react}} + \mu_{rt} \tag{10}$$

$$\sigma_{mo_{react}} = \sqrt{\sigma^2_{A_{react}} + \sigma^2_{rt}} \tag{11}$$

$$\mu_{mo_{guess}} = \tau + \mu_{nmd} \tag{12}$$

$$\sigma_{mo_{guess}} = \sqrt{\sigma^2_{\tau} + \sigma^2_{nmd}} \tag{13}$$

$$\mu_{reach_{react}} = \mu_{mo_{react}} + \mu_{mt} \tag{14}$$

$$\sigma_{reach_{react}} = \sqrt{\sigma^2_{mo_{react}} + \sigma^2_{mt}} \tag{15}$$

$$\mu_{reach_{guess}} = \mu_{mo_{guess}} + \mu_{mt} \tag{16}$$

$$\sigma_{reach_{guess}} = \sqrt{\sigma^2_{mo_{guess}} + \sigma^2_{mt}} \tag{17}$$

$$X_{reach_{react}} \sim \mathcal{N}(\mu_{reach_{react}}, \sigma_{reach_{react}}) \tag{18}$$

$$X_{reach_{guess}} \sim \mathcal{N}(\mu_{reach_{guess}}, \sigma_{reach_{guess}}) \tag{19}$$

$$P(Reach|React) = P(X_{reach_{react}} < 1500) \tag{20}$$

$$P(Reach|Guess) = P(X_{reach_{guess}} < 1500) \tag{21}$$

$$P(Indecision|React) = 1 - P(Reach|React) \tag{22}$$
$$P(Indecision|Guess) = 1 - P(Reach|Guess) \tag{23}$$

$$P(Correct|React) = 1.0 \tag{24}$$
$$P(Correct|Guess) = 0.5 \tag{25}$$

$$P(Win|React) = P(Reach|React) \cdot P(Correct|React) \tag{26}$$
$$P(Win|Guess) = P(Reach|Guess) \cdot P(Correct|Guess) \tag{27}$$

$$P(Incorrect|React) = P(Reach|React) \cdot (1 - P(Correct|React)) \tag{28}$$
$$P(Incorrect|Guess) = P(Reach|Guess) \cdot (1 - P(Correct|Guess)) \tag{29}$$

$$P(React|\tau) = P(A < T) \tag{30}$$

$$P(Guess|\tau) = 1 - P(React|\tau) \tag{31}$$

$$\begin{aligned} P(Win|\tau) =& P(React|\tau) \cdot P(Win|React) \\ &+ P(Guess|\tau) \cdot P(Win|Guess) \end{aligned} \tag{32}$$
$$\begin{aligned} P(Indecision|\tau) =& P(React|\tau) \cdot P(Indecision|React) \\ &+ P(Guess|\tau) \cdot P(Indecision|Guess) \end{aligned} \tag{33}$$
$$\begin{aligned} P(Incorrect|\tau) =& P(React|\tau) \cdot P(Incorrect|React) \\ &+ P(Guess|\tau) \cdot P(Incorrect|Guess) \end{aligned} \tag{34}$$

$$R_{win} = 1 \tag{35}$$
$$R_{indecision} = 0 \tag{36}$$
$$R_{incorrect} = 0 \tag{37}$$

$$\begin{aligned}\mathbb{E}[R|\tau] =& P(Win|\tau) \cdot R_{Win} \\ &+ P(Incorrect|\tau) \cdot R_{Incorrect} \\ &+ P(Indecision|\tau) \cdot R_{Indecision}\end{aligned} \tag{38}$$

$$\tau^* = \underset{\tau}{argmax}[\mathbb{E}(R|\tau)] \tag{39}$$

$$\mu_{mo_{guess}} = \tau + \mu_{nmd} + \mu_{switch} \tag{40}$$

$$\sigma_{mo_{guess}} = \sqrt{\sigma_\tau^2 + \sigma_{nmd}^2 + \sigma_{switch}^2} \tag{41}$$

$$\hat{\mu}_{mo_{guess}} = \tau + \mu_{nmd} + \hat{\mu}_{switch} \tag{42}$$

$$\hat{\sigma}_{mo_{guess}} = \sqrt{\sigma_\tau^2 + \sigma_{nmd}^2 + \hat{\sigma}_{switch}^2} \tag{43}$$

$$\mathcal{L} = \sum_{i=1}^{6} \sum_{j=1}^{5} \frac{|Data_{i,j} - Model_{i,j}|}{Data_{i,j}} \tag{44}$$