

$$U^{t+1} = \sum_{n=1}^N u_n^{t+1} = \sum_{n=1}^N \exp \left( \ln u^1 - y_n \sum_{t'=1}^t a_{t'} g_{t'}(x_n) \right) = \frac{1}{N} \sum_{n=1}^N \exp \left( -y_n \sum_{t'=1}^t a_{t'} g_{t'}(x_n) \right) = \frac{1}{N} \sum_{n=1}^N \exp \left( -y_n G^t(x_n) \right)$$