Suppose that the state of the world is uniformly distributed on the circle. Consider two message functions: $m_i(\theta) = \theta$.

Suppose that ϵ has a Beta distribution with mean zero:

$$f(\epsilon) \equiv \epsilon^{\alpha-1}(1-\epsilon)^{\beta-1}. \tag{1}$$

with support on $[-\bar{\epsilon}, \bar{\epsilon}]$, for some $\bar{\epsilon} > 0$. The receiver's optimal action is given by

$$A(\tilde{m}) = \int_{q_-(\tilde{m})}^{q_+(\tilde{m})} q f_\alpha(\tilde{m} - m(q)) dq. \tag{2}$$

The sender's and receiver's problems are just as before:

$$\min_m \int_{-\bar{\epsilon}}^{1+\bar{\epsilon}} \int_{q_-(\tilde{m})}^{q_+(\tilde{m})} (q - A(\tilde{m}))^2 f_\alpha(\tilde{m} - m(q)) dq d\tilde{m} \tag{3}$$

We approximate m with a step function.

$$m(q) = \sum_{k=0}^{N-1} \frac{k}{N} \cdot \mathbf{1}_{q_k \leq q < q_{k+1}} \tag{4}$$

Therefore, the sender's problem is to choose a partition $q_0 = 0 < q_1 < \ldots < q_N = 1\}$ of $[0, 1]$:

$$\max_{\{q_1, \ldots, q_{N-1}\}} \sum \tag{5}$$