Optimal Communication-Distortion Tradeoff in Voting

Debmalya Mandal (Columbia), Nisarg Shah (UofT), and David Woodruff (CMU)

> Social Welfare:

(a) $\sum_i v_i(a)$ [Voting]  
(b) $\sum_i \max_{a \in S} v_i(a)$ [k-selection]
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- **Communication** ($C(f)$): No. of bits reported by each voter
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- Optimal communication for a desired distortion \( d \):

<table>
<thead>
<tr>
<th>Elicitation</th>
<th>Voting</th>
<th>k-Selection</th>
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<tbody>
<tr>
<td>Deterministic</td>
<td>( \tilde{\Theta} \left( \frac{m}{d} \right) )</td>
<td>( \tilde{\Theta} \left( \frac{m}{kd} \right) )</td>
</tr>
<tr>
<td>Randomized</td>
<td>( \tilde{\Theta} \left( \frac{m}{d^3} \right) )</td>
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