

Approximation and Collusion in Multicast Cost Sharing

Joan Feigenbaum
Yale University

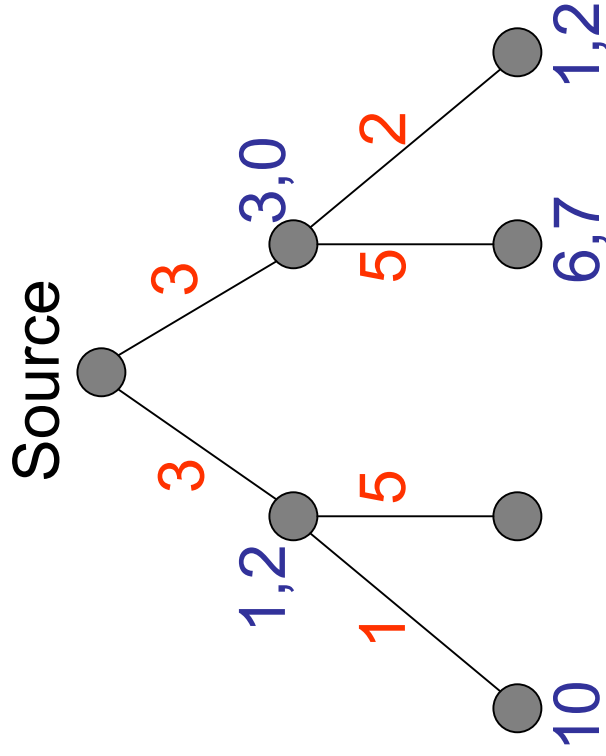
Supported by ONR/URI

<http://www.cs.yale.edu/~jf/FKSS.{ps,pdf}>

A. Krishnamurthy R. Sami S. Shenker

Multicast Cost Sharing

Mechanism-Design Problem:



Users' utilities
Link costs

Receiver Set

Which users receive the multicast?

Cost Shares

How much does each receiver pay?

Choose subset of receivers to maximize
[total utility - total costs]

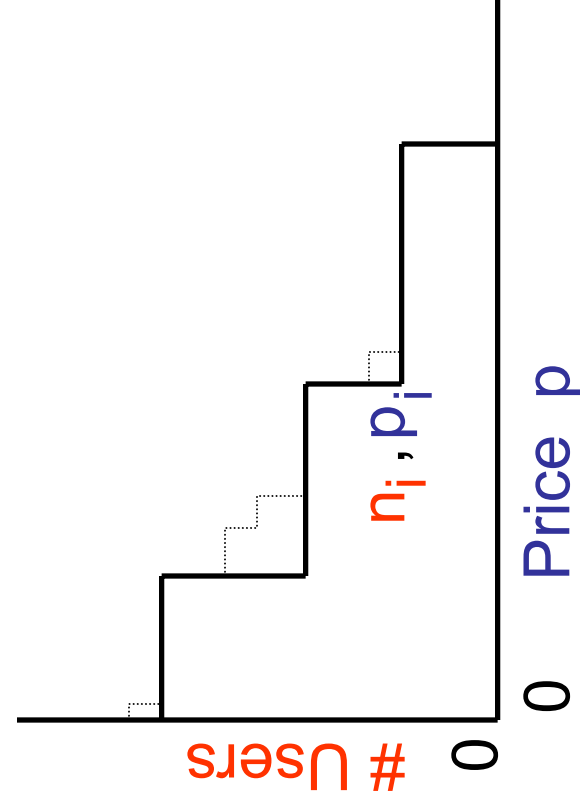
Prior Investigations of Two Natural Mechanisms

- Shapley value
 - Group-strategyproof
 - Budget-balanced
 - Minimum worst-case efficiency loss
 - Bad network complexity
- Marginal cost
 - Strategyproof
 - Efficient
 - Good network complexity

New Results

Scaled Step-Function Mechanism (SSF)

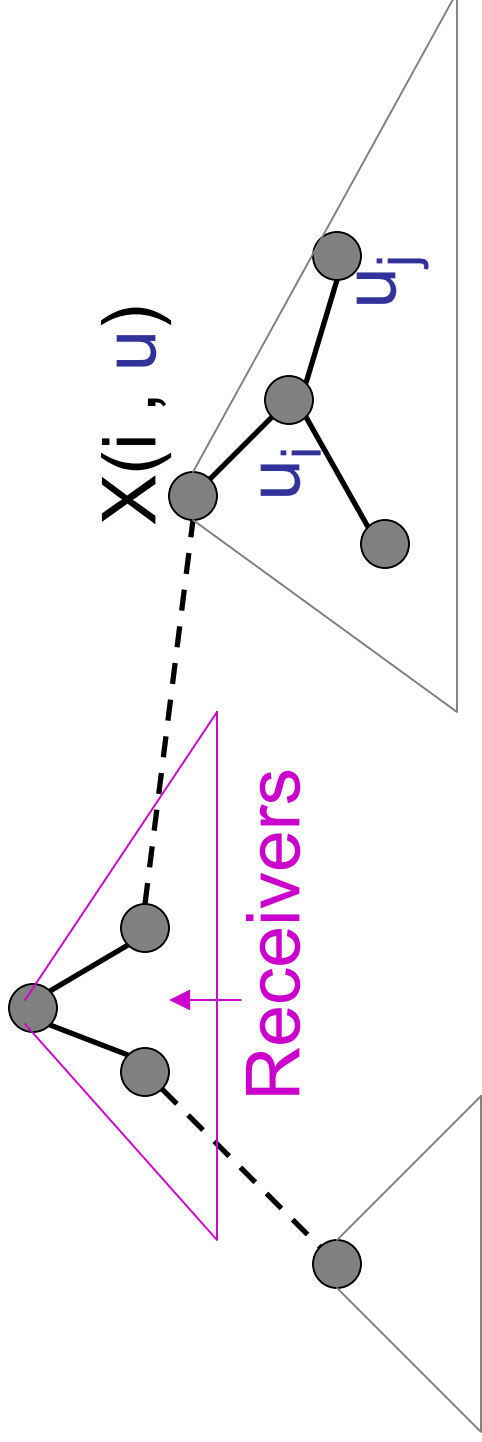
- Group-strategyproof
- Bounded budget deficit
- Bounded worst-case efficiency loss
- ✓ Good network complexity



$$n_l(p_j) = n_j$$

n_j users below link l would pay p_j for the use of links above l .

Groups That Can Defeat The MC Mechanism



Contains $\{i, j\}$

Welfare $(i) < u_j$

$j \in \text{Tree}(X(i, u))$

Next Steps

- Better bounds
- “Approximate strategyproofness” and “Approximate group-strategyproofness”
- Other solution concepts
- Other cost models

Presented at DIMACS workshop last week