Modifying Utility Function to Include Heterogenous Goods

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January 12, 2025

1.1 Your Utility Function

You have two kinds of utility:

- **auction good:** the utility of the item auctioned
- **collusion good:** the utility of collusion

Collusion shifts fee-allocation towards the collusion good.

$$p_i = \left(p^i_{ag} - p^i_{shift}\right) + \left(p^i_{cg} + p^i_{shift}\right)$$

p_i is unchanged, so collusion is rational if the user considers the collusion-good offers a higher marginal rate of utility:

Assume:

#1 the user truthfully values the auction good at bid v_i

#2 the user may value at least one collusion good more highly

Truthful preference revelation requires complete preferece maps

#2 is part of the user preference map

Your direct mechanism doesn't collect this information.

You do not have truthful preference revelation.

Myerson's Lemma requires truthful preference revelation.