Title: Approximation Algorithms for Product Framing and Pricing

Abstract: We propose one of the first models of “product framing” and pricing. Product framing refers to the way consumer choice is influenced by how the products are framed, or displayed. We present a model where a set of products are displayed, or framed, into a set of virtual web pages. We assume that consumers consider only products in the top pages, with different consumers willing to see a different number of pages. Consumers select a product, if any, from these pages following a general choice model. We show that the product framing problem is NP-hard. We derive algorithms with guaranteed performance relative to an optimal algorithm under reasonable assumptions. Our algorithms are fast, easy to implement, and dominate the best known performance bounds. We also present structural results for pricing under framing effects. At optimality, products are sorted in descending order of quality, and prices are shown to be page dependent, with higher prices associated with products on pages seen by fewer consumers, so products in the first page are of the highest quality and have the lowest prices.

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