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# A fractional programming method for optimal assortment under the nested-logit model

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## Abstract

We look at finding an assortment of products maximizing the expected revenue, where customer preferences are modeled by a nested logit choice model. This combinatorial problem is polynomial in a specific case and NP-hard otherwise. We provide an exact general method that embeds a tailored Branch-and-Bound algorithm into a fractional programming framework. We show that the fractional programming parameterized subproblem, a highly non-linear binary optimization problem, is decomposable by nests. The non-linear subproblem for each nest is solved by a tailored Branch-and-Bound algorithm with specific upper bounds. Our approach can solve instances with 5 nests and up to 5000 products per nest.

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