

## Master Thesis Proposal

### Assortment and Price Selection under the Mixed Multinomial Logit Model

The assortment selection problem is concerned with the question of which products to offer in the product line and is highly relevant in many industries. Sen et al. (2017) consider a version of the problem where customers choose according to a mixed multinomial logit model, the assortment decision is subject to a shelf-space constraint, and product prices are externally given. Even moderately sized instances of this problem are challenging to solve directly using standard mixed-integer linear optimization formulations. Therefore, Sen et al. (2017) develop a novel conic quadratic mixed-integer formulation that, together with McCormick inequalities, enables the solution of large instances using commercial optimization software.

The objective of this thesis is to

- review the recent literature on the assortment problem and discuss the approach of Sen et al. (2017) in detail;
- extend the assortment selection model by Sen et al. to also include discrete prices as decision variables as well as to consider more general capacity constraints on demand;
- implement the optimization problem and develop suitable solution methods to (if necessary heuristically) solve large problem instances in reasonable time;
- experimentally test the performance of the proposed solution methods with regard to solution speed and quality.

#### Recommended Basic Literature

**Sen, A., Atamturk, A., and Kaminsky, P. (2017):** A conic integer programming approach to constrained assortment optimization under the mixed multinomial logit model. arXiv preprint arXiv:1705.09040.