

## **A data-driven scenario generation framework for seasonal products using clustering.**

Stochastic programming is a well-established technique to address uncertainties associated with demand parameters in production planning models. However, these models are highly affected by the quality of generated demand scenarios. Several scenario generation methods have been discussed in the literature. Such techniques usually involve forecast error distributions, either parametric or non-parametric, where scenarios are generated by sampling from the distribution. So far, no research has been done specifically on seasonal products by analyzing seasonal patterns and the correlations between them to generate scenarios. This thesis aims to present an enhanced scenario generation framework by considering the specifications of seasonal patterns. For this purpose, the thesis is expected to investigate appropriate scenario generation techniques for seasonal demands, take advantage of the seasonality patterns to derive clusters, and incorporate cross-correlations between clusters for the scenario generation. Finally, it is expected from the thesis to implement the framework on appropriate open-source data.