

# **Production Chains: An application of stochastic programming from mechanical engineering**

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There are many uncertainties arising in production chains from mechanical engineering. We will present stochastic mixed integer models in particular for the process of drilling and for the production process chain as a whole. In process chains from a production context one encounters uncertainties that arise from various sources. Looking at the production process as a whole, one faces random sales forecasts, random prices, quality or even availability of resources. When considering the production process in finer granularity there arise uncertainties in every step of manufacturing. Taking as an example the process of drilling. While clamping the component, that is being worked on, uncertainties occur concerning deformation of that component. Further there may be randomness in the position of the drill. Even the speed of drilling may have an unpredictable impact on the final anatomy of the hole.

Trying to handle these uncertainties we will present models for both perspectives concerning the detailedness, giving insight into problems we encountered and approaches for solution strategies.