Chair of Service Operations Management

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Bachelor/Seminar/Master Thesis

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**Abstract** (Optional for Bachelor/Seminar Thesis)

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# List of Symbols (optional)

$σ$ standard deviation

$μ$ mean

C correlation matrix

# List of Abbreviations (optional)

C/D Confirmation/Disconfirmation

EM Expectation-Maximization

FM Finite Mixture

FMR Finite Mixture Regression

#

# Introduction

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## Problem Definition and Motivation

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## Ambition of the Thesis

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## Thesis Structure

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# Fundamentals of XXX

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## Basic Terms

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## XXX

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## A

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### A1

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### A1

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# A Model for Optimal Pricing

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## Model Assumptions

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## Data Basis

**Figure 1:** *This is the name of your figure*


The figure should be self-provided if possible.

### B1

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### B2

XXX

# Case Study

XXX

## Mathematical Problem

When presenting an optimization problem in your thesis, it's important to structure it clearly and methodically. Here's how you can do this, using a retail optimization problem as an example to illustrate each step. Always use “formulas” to write mathematical notations.

To ensure consistency in formatting the mathematical formulation of the model feel free to add the example as a “quick table” in word, this automatically formats and numbers your formulation. As you can later add the new rows from via the “quick table” function and then insert your objective function or constraints.

|  |  |  |
| --- | --- | --- |
|  | $$Example$$ | (1) |

Start by identifying and defining all the parameters and sets involved in your problem. This establishes the foundation of your model and ensures that readers understand the elements you're working with. Consider a retail store that needs to decide the optimal quantity of various products to stock for the upcoming season. We define the collection of all products available for stocking $P≔\{Apples,Bananas,Cherries\}$ indexed by $p$. Each product is assigned a purchase cost $c\_{p}$ and selling price $s\_{p}$ in Euro per unit, storage space required $v\_{p}$ in cubic meters, as well as an estimated demand $d\_{p}$ in units. To ensure applicability in the organization the total budget $B$ and storage capacity in their warehouse $V$ are considered.

Next, specify the variables that represent the decisions to be made. These variables are typically the quantities you will solve for in your optimization model. In the formulation of our model, we consider $x\_{p}$ as our decision variables denoting the number of units of product $p$ to stock.

Construct an objective function that represents the goal of your optimization problem. This function should be expressed in terms of your decision variables and parameters. Linking functions in text can be done via the cross-reference capabilities of word. Our objective (2) is to maximize the total profit from selling the products. The profit for each product is calculated by subtracting the purchase cost from the selling price and multiplying it by the number of units sold. The following is an example for an optimization problem:

|  |  |  |
| --- | --- | --- |
|  | $$Max. \sum\_{p\in P}^{}\left(s\_{p}-c\_{p}\right)⋅x\_{p},$$ | (2) |
| $$s.t.$$ | $$\sum\_{p\in P}^{}c\_{p}⋅x\_{p}\leq B,$$ | (3) |
|  | $$\sum\_{p\in P}^{}v\_{p}⋅x\_{p}\leq V,$$ | (4) |
|  | $$0\leq x\_{p}\leq d\_{p} ∀p\in P.$$ | (5) |

List all the limitations and requirements that must be considered in your model. Constraints ensure that the solution is feasible and adheres to real-world limitations. Explain how each part of your model relates to the real-world scenario. This helps readers understand the practical implications of your mathematical formulations. The budget constraint (3) ensures that the store does not spend more money on inventory than it has allocated. The storage capacity constraint (4) reflects the physical limitations of the warehouse; we cannot stock more products than the space allows. The demand constraint (5) prevents overstocking by ensuring we do not order more than is expected to sell, thus minimizing potential losses from unsold inventory.

Organize your presentation so that each section logically follows the previous one. Use consistent notation throughout and make sure all variables and parameters are clearly defined before use. Finally, review your model to ensure that it includes all relevant factors and accurately represents the problem you are addressing. Validate your model by considering whether it makes sense in the context of your specific scenario. Clarity and thoroughness are key when presenting complex problems. Ensure that all components of your model are well-explained and justified, enabling readers to follow your reasoning and appreciate the rigor of your analysis.

## C2

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**Table 1:** *This is the name of your table*

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*Note:* Here you can provide details and further information to the reader. X: XXXXX

# Discussion of Results

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## D1

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## D2

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## D3

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# Conclusion and Avenues of Future Research

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# Appendix A

## Appendix A.1: Socio-Demographics of Participants

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## Appendix A.2: Notation

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# Appendix B

## Appendix B.1: Analysis Results

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# List of References

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Place, Handover Date

WRITTEN SIGNATURE

Prename Surname

**Affidavit (translated version not legally binding)**

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