DISSERTATION

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Robust Area-Level Models in Small Area Estimation: Theory, Software and Simulation Studies

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CONTENTS

Part I

THEORY

This is the chapter where I want to present the theoretical concepts underpinning the development of software and application. Most notably is the robust version of a Fay-Herriot Type model with different variance-covariance structures.

1 REVIEW OF ROBUST METHODS IN SMALL AREA ESTIMATION

1.1 NEW SECTION

- item
  - item 1.1
  - item 1.2
  - new item

$$x_i = y_i$$
$$x_i + y_i = y_i$$

cite me: Abberger (1997)

```
x <- 1
plot(1:10)
```

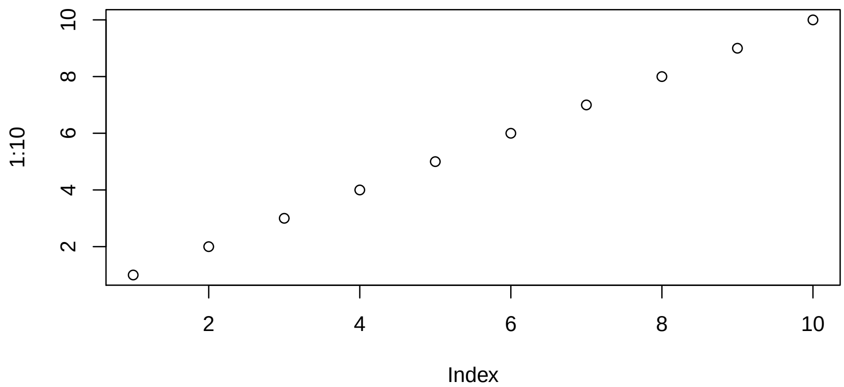

Figure 1: plot of chunk unnamed-chunk-2

2 THE ROBUST FAY-HERRIOT MODEL

Part II

SOFTWARE

This is the part where I want to introduce the software where the theoretical concepts find implementation.

3 SIMULATION TOOLS FOR SMALL AREA ESTIMATION

4 IMPLEMENTATION OF ALGORITHMS

5 ROBUST AREA-LEVEL MODELS IN SMALL AREA ESTIMATION

Part III

SIMULATION STUDIES

This is the part where I will present all results. Most certainly they will contain a lot of model- and design-based simulation studies for various settings. Maybe there will be more data available and I can present some applications.

6 MODEL-BASED SIMULATIONS

7 DESIGN-BASED SIMULATIONS

Part IV

APPENDIX

BIBLIOGRAPHY

Abberger, K. (1997). "Quantile smoothing in financial time series." In: *Statistical Papers* 38 (2), pp. 125–148.