

## Kinematic Measurement Systems

### 1 Introduction and Definitions

- 1.1 Definitions
- 1.2 Kinematic Measurement and Evaluation
- 1.3 Overview

### 2 Robot-Tachymeter

- 2.1 System Overview
- 2.2 Target Recognition and Target Tracking
  - 2.2.1 Automatic Rough Pointing
  - 2.2.2 Automatic Fine Pointing
  - 2.2.3 Target Tracking
- 2.3 Kinematic Measurements
  - 2.3.1 Time Delay and Synchronisation
  - 2.3.2 Positioning in Kinematic Mode

### 3 Further Kinematic Sensors

- 3.1 GNSS
- 3.2 Other Sensors

### 4 Modelling of Moving Objects

- 4.1 Dynamic System / Controlled System
- 4.2 Vehicle Models
  - 4.2.1 Steering Models
  - 4.2.2 Bicycle Models
  - 4.2.3 Track Models
- 4.3 Calibration of Steering Models
- 4.4 Prediction of Vehicles Movements
  - 4.4.1 Integration into Kalman Filter
  - 4.4.2 Different Geometric Models
  - 4.4.3 Integration of Future Information
- 4.5 Identification of Model Parameters

### 5 Control of Moving Objects

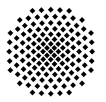
- 5.1 Closed-Loop-Systems
  - 5.1.1 General Characteristics
  - 5.1.2 Controlled Systems
  - 5.1.3 Typical Controllers and Controller Combinations
  - 5.1.4 Alignment of Controllers
  - 5.1.5 Control Quality
- 5.2 Integration of Filters and Measurement Techniques into Closed-Loop-Systems

### 6 Application of Guidance and Control in Construction

- 6.1 Closed-Loop-Systems on Construction Sites
- 6.2 Classification of Guidance Systems
- 6.3 Exemplary Applications

### 7 Simulator at IIGS

- 7.1 Simulation Concept
- 7.2 Realization
- 7.3 Exemplary Results



### Laboratories:

- Lab 1: Steering of Robot Tachymeters
- Lab 2: Programming of Robot Tachymeter
- Lab 3: Kinematic Tachymeter Measurements
- Lab 5: Kinematic GNSS Measurements
- Lab 5: Software Simulation for a Closed-Loop-System for Vehicles (demonstration)
- Lab 6: Tachymeter Closed-Loop-System for a Construction Machine Simulator (half of the group)
- Lab 7: GNSS Closed-Loop-System for a Construction Machine Simulator (half of the group)

### Literature:

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