Table of Contents

[1. Introduction 3](#_Toc494117223)

[1.1. Application scenarios 3](#_Toc494117224)

[1.2. Literature review 3](#_Toc494117225)

[1.2.1. Source localisation 3](#_Toc494117226)

[1.2.2. Source tracking 3](#_Toc494117227)

[1.3. Research problem 3](#_Toc494117228)

[1.4. Constraints 3](#_Toc494117229)

[1.5. Structure of thesis 3](#_Toc494117230)

[2. Theoretical Background 4](#_Toc494117231)

[2.1. Signal model 4](#_Toc494117232)

[2.1.1. Sparseness 4](#_Toc494117233)

[2.1.2. Pair-wise relative phase ratio 4](#_Toc494117234)

[2.2. Simulation of room acoustics 4](#_Toc494117235)

[2.3. Gaussian Mixture Model (GMM) 4](#_Toc494117236)

[2.4. Expectation-Maximization (EM) 4](#_Toc494117237)

[3. Description of algorithms 4](#_Toc494117238)

[3.1. Location estimation 4](#_Toc494117239)

[3.2. Source tracking 4](#_Toc494117240)

[3.2.1. TREM 4](#_Toc494117241)

[3.2.2. CREM 4](#_Toc494117242)

[4. Implementation 4](#_Toc494117243)

[4.1. Simulation framework 5](#_Toc494117244)

[4.1.1. Room environment 5](#_Toc494117245)

[4.1.2. Room impulse responses 5](#_Toc494117246)

[4.2. Location estimation 5](#_Toc494117247)

[4.3. Source tracking 5](#_Toc494117248)

[4.4. Evaluation scenarios 5](#_Toc494117249)

[4.4.1. Variable parameters 5](#_Toc494117250)

[4.4.2. Static scenarios 5](#_Toc494117251)

[4.4.3. Dynamic scenarios 5](#_Toc494117252)

[5. Results 5](#_Toc494117253)

[5.1. Source location estimation 5](#_Toc494117254)

[5.2. Source trajectory tracking 5](#_Toc494117255)

[5.3. Critical review 6](#_Toc494117256)

[6. Conclusion 6](#_Toc494117257)

[6.1. Summary of findings 6](#_Toc494117258)

[6.2. Directions for further research 6](#_Toc494117259)

# Introduction

## Application scenarios

## Literature review

### Source localisation

#### Cross-correlation

##### GCC-PHAT

### Source tracking

#### Kalman Filters

#### Particle filters

#### Recursive Expectation-Maximization

##### TREM

##### CREM

## Research problem

## Constraints

## Structure of thesis

# Theoretical Background

## Signal model

### Sparseness

### Pair-wise relative phase ratio

## Simulation of room acoustics

## Gaussian Mixture Model (GMM)

## Expectation-Maximization (EM)

# Description of algorithms

## Location estimation

## Source tracking

### TREM

### CREM

# Implementation

## Simulation framework

### Room environment

### Room impulse responses

#### Static sources

#### Moving sources

## Location estimation

## Source tracking

## Evaluation scenarios

### Variable parameters

### Static scenarios

### Dynamic scenarios

# Results

## Source location estimation

## Source trajectory tracking

## Critical review

# Conclusion

## Summary of findings

## Directions for further research