# Alan Turing's morphogenesis: on the wonders of nature

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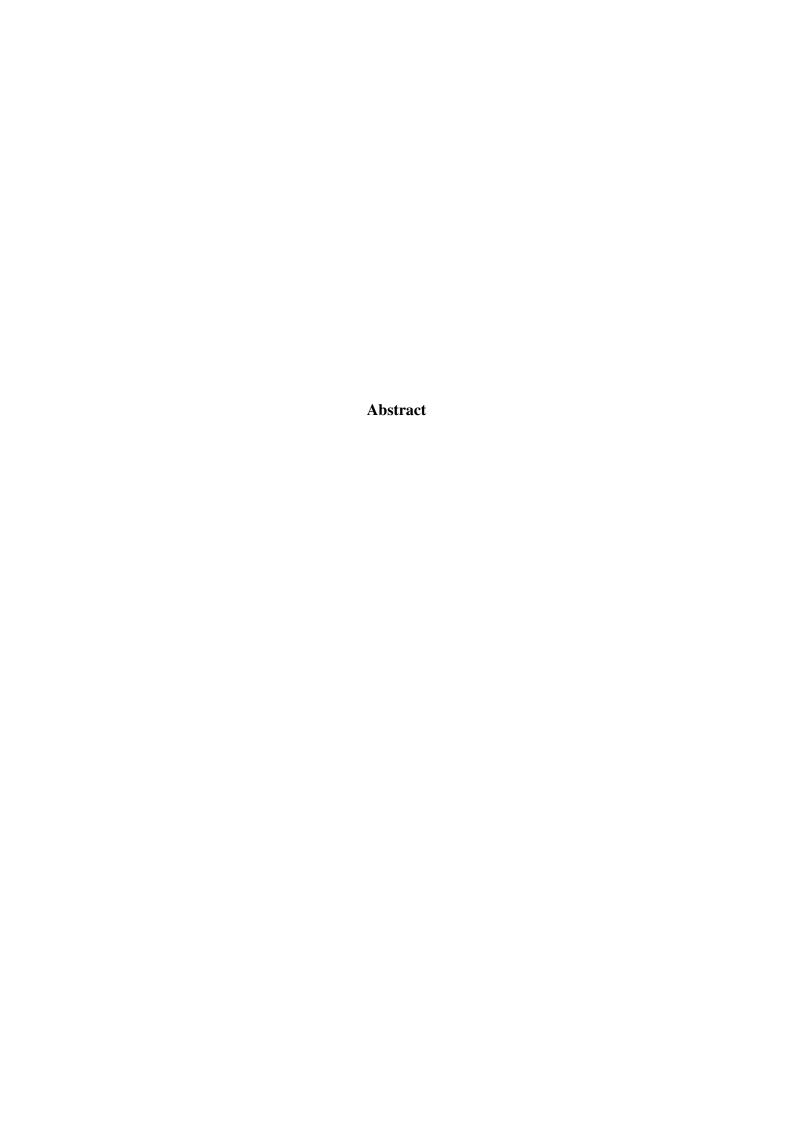
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#### Introduction

- 1.1 Project Proposal
- 1.2 Background
- 1.3 Approach
- 1.4 Results
- 1.5 Report Structure

## Background

- 2.1 Mathematical Background
- 2.1.1 Linear Systems
- 2.2 Chemical background
- 2.3 Programming background
- 2.4 Tools Used

# Morphogenesis

- 3.1 Alan Turing
- 3.2 Gray Scott Model
- 3.3 Other models

# **Mathematical Background**

- **4.1 Dynamical Systems**
- 4.1.1 Linear systems
- 4.1.2 Non-Linear Systems
- 4.2 Euler's Method

# **Chemical Background**

- **5.1** Chemical Reactions
- **5.2** Catalysts-Inhibitors
- 5.3 Morphogens
- 5.4 Examples

#### **Programming**

- 6.1.1 Modelling morphogenesis
- **6.1.2** Integrating differential equations

**Numerical Stability** 

**Plotting** 

- **6.1.3** Creating Movies
- 6.1.4 Playing Sound
- **6.2** Java
- **6.2.1** Implementing Euler's method
- **6.2.2** Thread management
- 6.2.3 Scheduling problem

**Random scheduling** 

**Round Robin** 

**Random scheduling** 

Diffusion inspired scheduler

#### **Results**

- 7.1 Chemical Reactions
- 7.2 Diffusion
- 7.3 Reaction-Diffusion
- 7.3.1 Linear Models
- 7.3.2 Non-Linear Models
- 7.4 Sound Producing
- 7.5 Scheduling Algorithms
- 7.5.1 Comparison
- 7.6 Summary of Results

## Conclusion

# **Appendix A**

#### Matlab

#### A.1 Gray\_Scott\_Model.m

# **Appendix A**

# Java

#### A.1 ODE.java

# **Appendix A**

# References