Machine (or Reinforcement): Learning to assist vessel docking in extreme environments

Bachelor defense

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SDU

Agenda

- Quick introduction to the problem
- Reinforcement Learning
- Simplified model
- Results & Discussion
- Conclusion & Future work

Overview of the problem

- Vessel stabilizer
- Why is a vessel stabilizer needed?
- What is Dacoma’s current solution?
- The objective
- The approach

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Overview:

- Classic Reinforcement Learning & Terminology
- The approach
- Issues and shortcomings

Terminology

- Agent
- Environment
- States, statespace, actions & actionspace
- Reward and reward function
- Policy

Classic Reinforcement Learning (CRL)

- Markov Decision Process (MDP)
- Problem review
- Why CCRL does not fit on this problem

Introduction

Curriculum for Reguleringsteknik (REG)

Matematiske og grafiske metoder til syntese af lineære tidsinvariante systemer:[1]

- diskret og kontinuert tilstandsbeskrivelse
- analyse i tid og frekvens
- stabilitet, reguleringshastighed, følsomhed og fejl
- digitale PI, PID, LEAD og LAG regulatorer (serieregulatorer)
- tilstandsregulering, pole-placement og tilstands-estimering (observer)
- optimal regulering (least squares) og optimal tilstands-estimation (Kalman-filter)

Færdigheder:
Efter gennemførelse af kurset kan den succesfulde studerende:

- kunne analysere, dimensionere og implementere såvel kontinuert som tidsdiskret regulering af lineære tidsinvariante og stokastiske systemer

Kompetencer:
Efter gennemførelse af kurset kan den succesfulde studerende:

- anvende og implementere klassiske og moderne reguleringsteknikker for at kunne styre og regulere en robot hurtig og præcist

[1] Based on https://fagbesk.sam.sdu.dk/?fag_id=39673