Title - Keywords + Reference to application/Context

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Abstract

- Context [1 to 2 ph]
  - Theme/ Broad intro
  - Identified gap in research
  - Problem statement
- Contribution
  - *This work presents ...*
- Related work
- Conclusion on results *Contrary to previous solutions, the method introduced in this work closes the gap*

1 Introduction

- Broad Introduction
- Context
- Application Examples [Understandable by reviewers outside of the field]
  - Inspection/ Maintenance of offshore structures/systems
  - Biodiversity monitoring
  - Explore sunk wreckage
  - Help understanding of the ocean
  - Unlock new technology (offshore energy production)
  - Replace arduous/dangerous work
  - Ease work conditions
  - ...
- Problem Statement [Make things very clear]
  - Pas de GPS sous l'eau
  - Pas de methode de localisation fiable
  - Manque de controlleur robuste et simple sans modele
  - Need for efficient obstacle avoidance solution for sailboat
  - Limits due to ROV cables
  - Limited autonomy needs to be enhanced
  - Limited maneuverability needs to be enhanced
  - Limitations in computational power
  - Limitations in onboard volume/space/weight
  - Aim toward frugality
  - Need for new docking solutions
  - Need for new locomotion solution
  - ...

1.1 Related Works

mettre en avant les problemes

- Ancestral methods in the field
  - Methods to compare to (PID/SMC/LQR/Kalman)
- Recent works in the field (less than 5/10 years)
  - Methods to compare to (MPC/ADRC/IA/NN)
  - Pick 2 to 4 methods total to compare to
  - Can be some of your previous works
- Broadly related works [For reviewers outside of the field]
  - Different domain but same goal
    - Terrestrial/Flying
    - Biomimetism
    - Manipulator arms
    - Network management
    - ...
  - Different application but comparable problems

1.2 Contribution

bullet points

- Description of the concept/ Method / Approach / Hypothess
- Bullet points contributions
- Results obtained
- Why/How is it novelty ?
  - *Closes the gap in research*
  - *Never done before*
  - *Contrary to* [methods introduced in related work] *this new approach allows ...*

1.3 Outline

2 Problem Definition and Preliminaries [Material and Methods]

2.1 Problem Definition

- If possible : relate an application problem to math constraint (e.g. gimbal loc)
- Detail application
  - Trajectories
  - Specific need
  - Specific Environment
- Usual assumptions + why [Bullet points]
  - Horizontal plane *aucun effet des phénomènes hors du plan horizontal sur la solution*
  - Constant/slowly varying disturbance
  - Bounded disturbance
  - Bounded inputs
  - Recall limitations from intro

2.2 Preliminaries

- Mathematical tools
  - Interval analysis
  - Command methods
  - Optimization problems ...
- Techno
  - Description of the system
  - Sensors
  - Computational power / Architecture
- Model description
- Notation

3 Main contributions

3.1 Complicated/Unfamiliar Hypotheses demonstration

- If some assumptions are not usual: demonstrate they are well thought

3.2 Design of the solution

- Equations
- Technological solution
- Algorithm
- ...

3.3 Analysis

- Math : Theorem/Proof
  - Theorem : *Controller [] introduced in [] ensures stability of system [] towards reference []*
  - Proof : *Lyapunov analysis*
- ?

4 Results

4.1 Simulation

- Simulator
  - Assumptions
  - Modelled phenomena (current, waves, wind, ...)
  - Type of simulator
    - Python/Matlab : Math results (control/stability...)
    - Multiphysics/Gazebo : Application results (Obstacle avoidance, Robotic concept, ...)
- Comparative methods
- Results
  - Concept alone + Discussion
  - Comparative figure + Discussion
  - Table of Results
    - Comparison metrics

4.2 Experiments

- Context of the experiment
  - Consequences on the system
- Comparative methods
- Results
  - Concept alone + Discussion
  - Comparative figure + Discussion
  - Table of Results
    - Comparison metrics

5 Discussion / Conclusion

- Go back to abstract/Intro
- Show how the gap in research has been closed
  - Recall some comparative metrics
  - Recall some outstanding performance
- Future works
  - Future needs highlighted by your work
  - Future steps to application of your work

References