

# Bo Sun

Reinforcement learning; Adaptive Optimal Control; Aerial Robotics



PhD at TU Delft  
Control & Simulation Sec  
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## SKILLS

Python  
C  
Matlab/Simulink  
PyTorch  
Control /Electronics  
Aerospace/Robotics

## STRENGTHS

Analytical  
Creative  
Problem-solving  
Organized

## Recreation

Bouldering  
Tennis  
Badminton  
Table tennis

## LANGUAGES

Chinese  
English

## Professional Profile

Devoted to the intelligent flight system design using reinforcement learning-based methods. Committed to learning and implementing new technology and methods. Interested in advanced artificial intelligence research. Proficient in aerospace engineering and robotics. Able to propose new problems from both theory and practice, and efficiently solve problems. Willing to help others and cooperate as a team. Skilled to supervise master students.

## Education

PhD	Intelligent Control	Delft University of Technology	2018 - now
MSc	Aerospace Guidance	Northwestern Polytechnical University	2016 -2019
BSc	Flight Control	Northwestern Polytechnical University	2012 -2016

## Research Experience

- ❖ Combine intelligent control methods with real aerospace systems, including aeroelastic airfoil, morphing wing section (SmartX project) and quadcopter.
- ❖ Introduce event-triggered control schemes into intelligent control systems to save computational load and decrease communication burden.
- ❖ Improve the critic network of the current global dual heuristic programming algorithm with explicit analytical calculations to make it more explainable.
- ❖ Design reinforcement learning control algorithms incorporating an online identification paradigm based on locally linear regression, which can deal with partial observability, external disturbances and sudden faults.
- ❖ Conduct a hardware-in-the-loop simulation of a small loitering aircraft control system using 6-DOF modules on 3-axis turntable and 5-axis turntable.
- ❖ Develop several nonlinear aircraft guidance methods such as model predictive control and reinforcement learning, under disturbances, input saturation and model uncertainties.
- ❖ Work as a team to design a dancing robot from scratch, including schematic, electronics, and embedded software. Win national robot competition champion.

## Featured Publications

- ❖ Bo Sun, Tigran Mkhoyan, Erik-Jan van Kampen, Roeland De Breuker, and Xuerui Wang "Vision-Based Nonlinear Incremental Control for A Morphing Wing with Mechanical Imperfections" IEEE Transactions on Aerospace and Electronic Systems, under review.
- ❖ Bo Sun, Xuerui Wang, and Erik-Jan van Kampen. "Event-Triggered Intelligent Critic Control with Input Constraints Applied to a Nonlinear Aeroelastic System" Aerospace Science and Technology, 120(2022):107279.
- ❖ Bo Sun, and Erik-Jan van Kampen. "Event-triggered Constrained Control Using Explainable Global Dual Heuristic Programming for Nonlinear Discrete-Time Systems." Neurocomputing 468(2022): 452-463.
- ❖ Bo Sun, and Erik-Jan van Kampen. "Intelligent Adaptive Optimal Control Using Incremental Model-Based Global Dual Heuristic Programming Subject to Partial Observability." Applied Soft Computing 103(2021): 107153.