



大连理工大学

DALIAN UNIVERSITY OF TECHNOLOGY

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# Running Ace Contest of Underwater Robots, DUT Boosts Marine Equipment Intelligence

Source: ETDZ of DUT

Dalian is a city born and nurtured by the sea. Recently, Underwater Robot Picking Contest (URPC) 2020 and the Summit Forum on Artificial Intelligence and Underwater Robots 2020 were held in Dalian.



URPC was initiated by the National Natural Science Foundation of China and has been organized since 2017. It is the first contest of intelligent robots in a real offshore environment in the world. It has become a leading high-end contest in the field of underwater detection and agile operation. As one of the major hosts of previous contests, Dalian University of Technology (DUT) has been supporting the contest.



In this competition, 20 teams from Chinese universities, scientific research institutions and enterprises participated in the offline man-machine cooperative picking group and self-picking group, and 290 teams and 170 individuals signed up to the online target recognition group. Compared with previous ones, this competition was held in real offshore water, where the condition is volatile and complicated, making the competition more technically challenging. Therefore, the intelligence of underwater robots is highlighted.

In the end, the team OurEDA from DUT won the first prize of the self-picking group, and made a breakthrough from “zero picking” over the last three contests to picking 11 sea products this time. The team Starfish from Dalian Maritime University won the first prize in the man-machine cooperative picking group, and the team from Peking University won the first prize in the target recognition group. In addition, the team “Chi Jia Hong” from DUT won the third prize of the man-machine cooperative picking group.



The Summit Forum of Artificial Intelligence and Underwater Robots was on at the same time. Five academicians, over 100 well-known experts and scholars including Changjiang Scholars, Distinguished Young Scholars, and Excellent Young Scholars, and more than 150 industry representatives were invited to Dalian for academic exchanges.

The contest was broadcast live by CCTV, which makes the contest more educational, more enjoyable, and more popular.



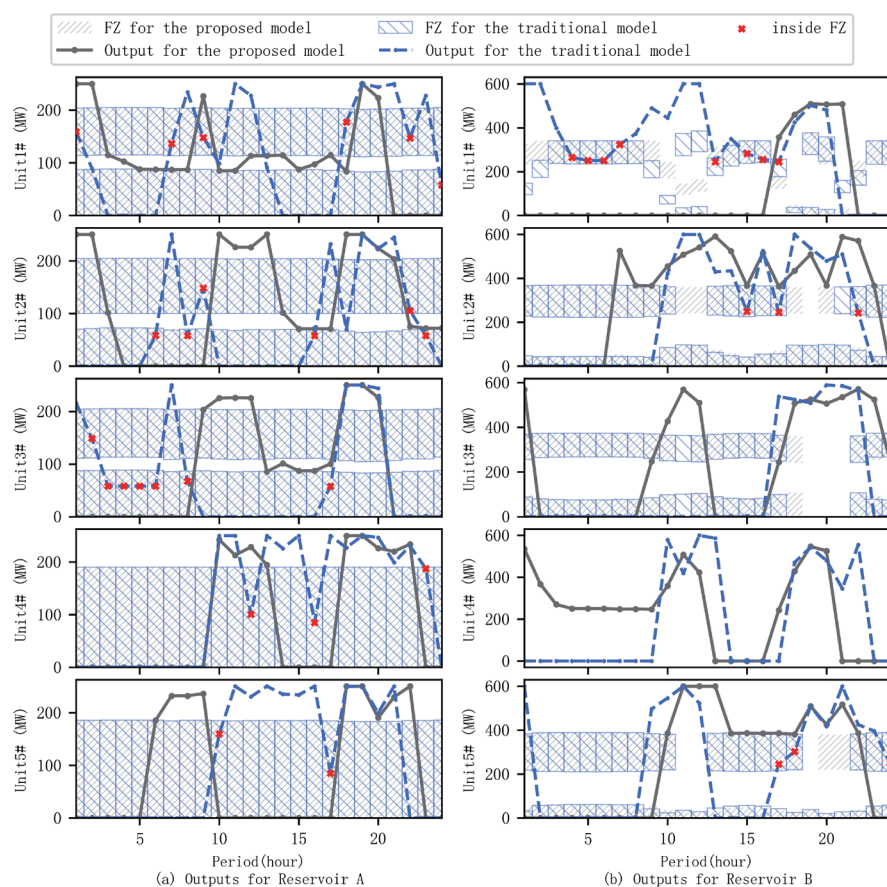
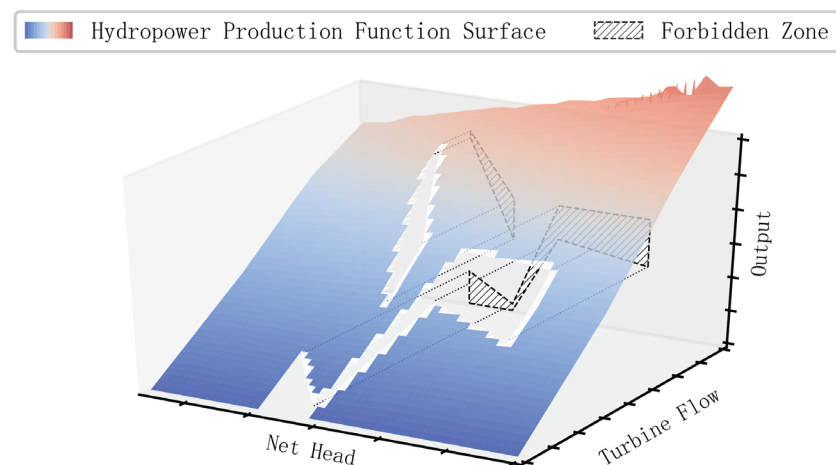


# Professor Cheng Chuntian's Team Made Significant Progress in Solving the Problem of Complex Forbidden Zones in Southwest Giant Hydropower Stations

Source: Faculty of Infrastructure Engineering

Recently, Prof. Cheng Chuntian's team from Institute of Hydropower & Hydroinformatics of DUT published an important work entitled *A MILP based Framework for the Hydro Unit Commitment Considering Irregular Forbidden Zone Related Constraints* on *IEEE Transactions on power systems*, which is a top journal of power systems (DOI:10.1109/TPWRS.2020.3028480).

The irregular forbidden zone(FZ) is a common phenomenon with giant hydropower plants developed in the past two decades in China. Irregular shapes of FZs significantly challenge hydro unit commitment (HUC). The work of Prof. Cheng's team proposes a novel MILP based framework for HUC considering irregular FZ related constraints including the FZ constraint, effects of linearization errors in both the net head and the output, and the FZ crossing constraint. In the framework, the FZ constraint is handled by the optimal convex partitioning algorithm and the common structure-based formulation method. Inspired by the planar translating robot placement problem, linearization errors are considered by the Minkowski sum method. To handle the FZ crossing constraint, they then propose a graph theory-based approximate formulation method. The framework is integrated into a HUC model with an objective of peak shaving. The model is then tested with a batch of real-world instances of a cascade hydropower system formed by ten giant units with highly irregular FZs. The results show their framework can effectively consider the irregular FZ related constraints. The major advantage of their framework is its ability to handle the irregular shapes of FZs without any tedious and error-prone manual processing.



In 2008, during the process of developing the advanced water dispatching application software for China Southern Power Grid, Prof. Cheng's team was the first to discover the problem of forbidden zones in Tianshengqiao First Cascade and Second Cascade Hydropower Stations, which is a very thorny issue for power grids and power generation enterprises. It was founded that the same problem also exists widely in world's top 20 hydropower stations, such as Xiluodu station, Xiaowan station, Longtan station and Nuozhadu station. For more than a decade, the team has been committed to solving this problem in terms of both fundamental theory and engineering implementation technology, and this paper is a summary of the latest research results, which is supported by the National Natural Science Foundation of China.





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## Opening Ceremony of 2020 DUTers was Successfully Held

Source: DUT News Center, Publicity Department

With a cool autumn breeze, the Opening Ceremony of 2020 DUTers was successfully held at the Center Sports Field. The new DUTers gather together to start the new chapter of their lives with spectacular performances. From this day onwards, the students will have the cherished name of “DUTer” for the rest of their lives. We wish the 2020 new students of Dalian University of Technology a happy start here!



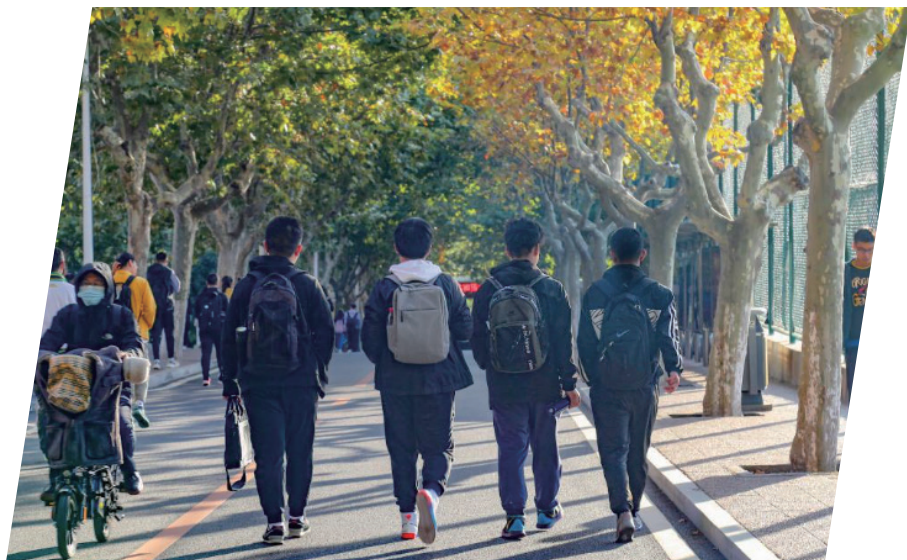




# DUT Resumes Face-to-face Teaching

Source: DUT News Center, Publicity Department

October 12<sup>th</sup> is the first day for undergraduate students of DUT to have lectures in the physical classrooms. With the breeze and warm sunshine, they head for the long-awaited “face-to-face” meeting between teachers and students.



Pic. 1-2 DUTers on their way to classrooms



Pic.3-4 DUTers taking lectures

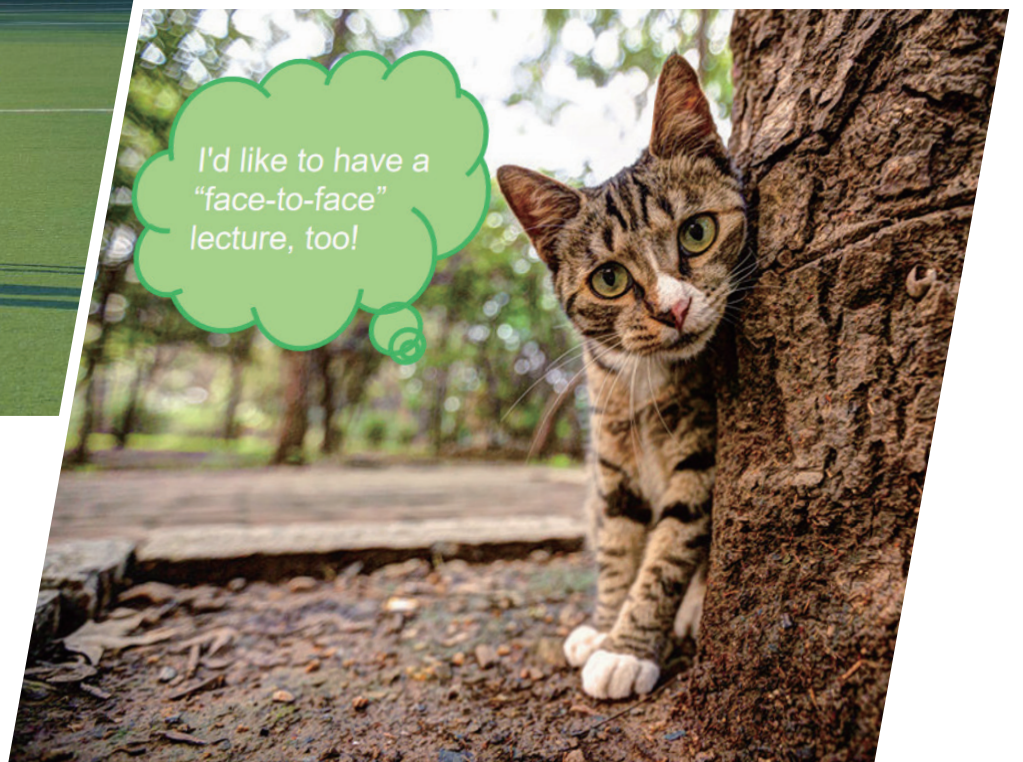
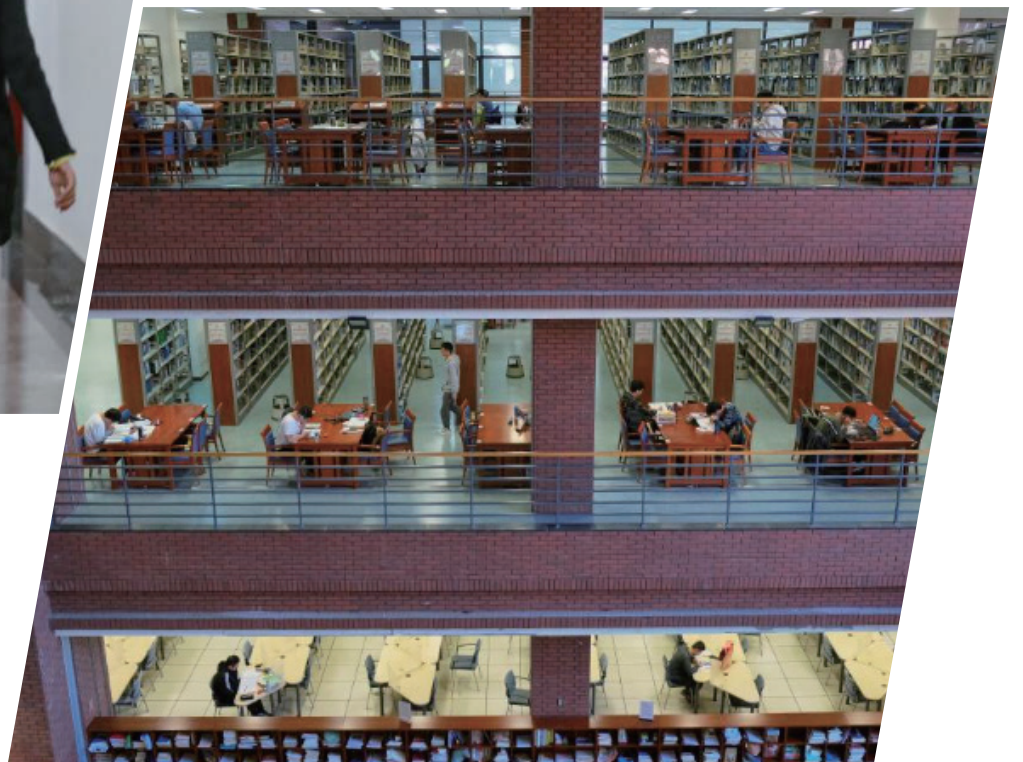


Pic. 5-6 Teachers and students having discussions





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Pic. 7-10 Colorful life after class