

Forward flight performance of multirotor

Report Number: R19ETET07

Subject Category: Skills Acquisition System

URL: <https://www.jss.jaxa.jp/en/ar/e2019/11633/>

● Responsible Representative

Yuto Sayama, Undergraduate student, Tokyo University of Agriculture and Technology

● Contact Information

Yuto Sayama(y-sayama@st.go.tuat.ac.jp)

● Members

Yasutada Tanabe, Yuto Sayama, Kaito Hayami, Hideaki Sugawara

● Abstract

Study of forward flight performance of multicopter

● Reasons and benefits of using JAXA Supercomputer System

In order to perform a rotorcraft analysis tool.

● Achievements of the Year

Numerical analyses are performed on a multicopter propeller using a rotorcraft CFD tool to investigate the effect of blade twist on forward flight performance. Results obtained by numerical analyses shows that the equivalent lift-to-drag ratio increases as a blade twist decreases at a high advancing ratio condition (Fig. 1)., As a result, it is suggested that the blade twist must be determined to balance a hovering performance with a forward flight performance.

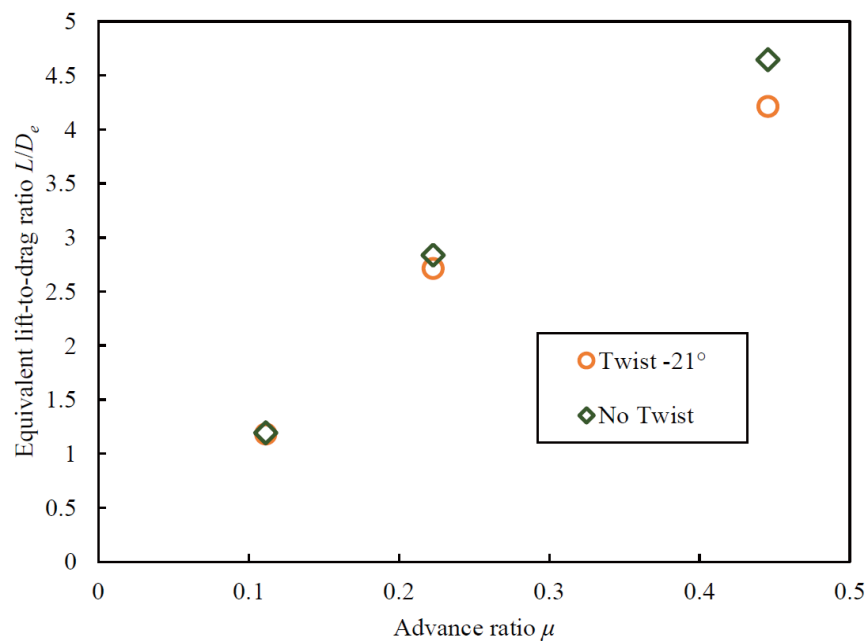


Fig. 1: The relation between the advance ratio and the equivalent lift-to-drag ratio. The untwisted blade get higher equivalent lift-to-drag ratio.

● Publications

N/A

● Usage of JSS2

● Computational Information

Process Parallelization Methods	N/A
Thread Parallelization Methods	OpenMP
Number of Processes	1
Elapsed Time per Case	10 Hour(s)

- **Resources Used**

Fraction of Usage in Total Resources*¹(%): 0.06

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage* ² (%)
SORA-MA	0.00	0.00
SORA-PP	78,729.71	0.51
SORA-LM	0.00	0.00
SORA-TPP	47,170.29	2.85

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage* ² (%)
/home	759.47	0.63
/data	17,311.80	0.30
/tmp	3,284.80	0.28

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage* ² (%)
J-SPACE	0.00	0.00

*¹: Fraction of Usage in Total Resources: Weighted average of three resource types (Computing, File System, and Archiver).

*²: Fraction of Usage : Percentage of usage relative to each resource used in one year.