

Propulsive performance and flow field characteristics of a 2-D flexible fin with variations in the location of its pitching axis (PDF)

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Title: Propulsive performance and flow field characteristics of a 2-D flexible fin with variations in the location of its pitching axis

作者: -

Author(s): [WANG Zhi-dong1*](#); [CONG Wen-chao1](#) and [ZHANG Xiao-qing2](#)

1. School of Naval Architecture and Ocean Engineering, Jiangsu University of Science and Technology, Zhenjiang 212003, China 2. Det Norske Veritas, Shanghai 200336, China

关键词: [flexible fin](#); [pitching axis](#); [Strouhal number](#); [maximal attack angle](#); [propulsive performance](#)

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摘要: The thrust coefficients and propulsive efficiency of a two-dimensional flexible fin with heaving and pitching motion were computed using FLUENT. The effect of different locations of the pitching axis on propulsive performance was examined using three deflexion modes which are respectively, modified Bose mode, cantilever beam with uniformly distributed load and cantilever beam with non-uniformly distributed load. The results show that maximum thrust can be achieved with the pitching axis at the trailing edge, but the highest propulsive efficiency can be achieved with the pitching axis either 1/3 of the chord length from the leading edge in modified Bose mode, or 2/3 of the chord length from the leading edge in cantilever beam mode. At the same time, the effects of the Strouhal number and maximal attack angle on the hydrodynamics performance of the flexible fin were analyzed. Parameter interval of the maximum thrust coefficient and the highest propulsive efficiency were gained. If the Strouhal number is low, high propulsive efficiency can be achieved at low α , and vice versa.

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