عنوان مقاله:

Nonlinear Control Simulation of Supercavitation Torpedoes using MATLAB SIMULINK model

محل انتشار:

نهمین همایش ملی صنایع دریایی ایران (سال: 1386)

تعداد صفحات اصل مقاله: 14

نویسندگان:

Rezaei - *Tehran Polytechnic University, Faculty of Marine Engineering*

Nikfarjam - *Tehran Polytechnic University, Faculty of Marine Engineering*

Mazinani - *Tehran Polytechnic University, Faculty of Marine Engineering*

خلاصه مقاله:

Underwater travel is greatly limited by the speed that can be attained by the vehicles. Usually, the maximum speed achieved by underwater vehicles is about 40 m s. Supercavitation can be viewed as a phenomenon that would help us to break the speed barrier in underwater vehicles. The idea is to make the vehicle surrounded by water vapor while it is traveling underwater. Thus, the vehicle actually travels in air and has very small skin friction drag. This allows it to attain high speeds underwater. It is really hard to control and maneuver a supercavitating vehicle. The first part of this paper deals with modeling of a supercavitating torpedo. Nonlinear equations of motion are presented in detail. The latter part of the work deals with finding a controller to maneuver the torpedo. A controller is obtained by LQR synthesis. For the synthesis, it is assumed that the cavity is fixed and the torpedo is situated symmetrically in the cavity. The robustness analysis of the LQR controllers is carried out by calculating the gain and phase margins. Simulations of the response for a perturbed system also have been studied.

کلمات کلیدی:

لینک ثابت مقاله در پایگاه سیویلیکا:

https://civilica.com/doc/31083