

SPEED CONTROL SYSTEM FOR MANIPULATORS INSTALLED ON UMANNED UNDERWATER VEHICLES

A.Yu. Konoplin, N.A. Krasavin

The article deals with the problem of developing a method for synthesizing a system of automatic formation of a variable speed of movement of an underwater multilink manipulator along complex spatial trajectories. This system allows to maintain the specified accuracy of operations in the conditions of dynamic positioning of an unmanned underwater vehicle near the object of work. The introduced additional contour for forming the speed of movement of the manipulator grip allows to consider the dynamic capabilities of its electric drives. At the same time, the system takes into account the capabilities of the vehicle to hold given position accurately in the conditions of external disturbing influences created by a working manipulator. As a result, the speed of movement of the grip is automatically reduced when the vehicle cannot effectively stabilize its position for certain degrees of mobility due to design features. Numerical simulation of the operation of the control system synthesized on the basis of the proposed method was performed. It utilized a model of a PUMA-type manipulator created in Matlab/Simulink, installed on an unmanned underwater vehicle stabilized in hovering mode. System operation was visualized in the virtual simulation environment of CoppeliaSim. The results of the simulation confirmed the operability of the developed control system and showed the effectiveness of its implementation by improving the accuracy of underwater manipulation operations.

Keywords: multilink manipulator, unmanned underwater vehicle, dynamic positioning, control accuracy, underwater operations.

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About the authors

KONOPLIN Alexander Jurevich, Ph.D, head of laboratory
Institute of Marine Technology Problems Far Eastern Branch of RAS;
Far Eastern Federal University

Research interests: automatic control of underwater robots and
manipulators, adaptive control, information and control systems

Address: 690091, Vladivostok, Suhanova str., 5a

Phone: +7(924)429-83-96

E-mail: konoplin@marine.febras.ru

ORCID: 0000-0001-7554-1002

KRASAVIN Nikita Andreevich, acting Junior Researcher
Institute of Marine Technology Problems Far Eastern Branch of RAS;

Address: 690091, Vladivostok, Suhanova str., 5a

Research interests: automatic control of underwater robots and ma-
nipulators, adaptive control, information and control systems

Phone: 89025063014

E-mail: krasavin.na@students.dvfu.ru

ORCID: 0000-0003-1102-5409

