The paper deals with the peculiarities of dynamic model of the autonomous underwater robot [4] and implementation of programmed motion taking into account contradictory requirements of stability and accuracy depth stabilization or equidistant curve with regard to relief. It also gives examples of practical realization of the offered solutions in the structure and algorithms of motion control of certain autonomous underwater vehicles-robots.

References

1. Ageev M.D., Kiselyov L.V., Matviyenko Yu.V. et al. Autonomous Underwater Vehicles. Systems and Technologies/ Ed. Acad. Ageyev M. D. , M: Nauka, 2005, 400 p.
2. Kiselyov L.V., Vaulin Yu.V., Inzartsev A.V., Matviyenko Yu.V. Underwater Navigation, Control and Orientation // Mechatronics, Automation, Control, 2004, No. 11, p. 35-42.
3. Kiselyov L.V., Inzartsev A.V., Matviyenko Yu.V. Development of Intelligent AUVs and Problems of Research Integration // Underwater Investigation and Robotics. 2006, No. 1, p. 6-17.
4. Kiselyov L.V., Medvedev A.V. Investigation of Autonomous Underwater Robot Dynamic Characteristics on the Basis of Process Typology and Models of Fuzzy Control // Underwater Investigation and Robotics, 2006, No. 1(5), p. 16-23.

GLOBAL POSITIONAL SYNTHESIS AND FINITE-TIME STABILIZATION OF MIMO GENERALIZED TRIANGULAR SYSTEMS BY MEANS OF CONTROLLABILITY FUNCTION METHOD

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We solve the problem of global stabilization in finite time by means of a continuous feedback law for a general class of tridiagonal multi-input and multi-output systems with singular input-output links. We combine the controllability function method (which works locally around the equilibrium) with a modification of global construction developed in previous works for the singular case.

ABOUT EXTREMALITY, STATIONARITY, AND REGULARITY

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Introduction. Extremality, stationarity, and regularity properties of collections of sets in a normed linear space are characterized in terms of certain primal and dual constants.

1. Primal Constants. Consider a collection of sets $\Omega_1, \Omega_2, \ldots, \Omega_n$ $(n > 1)$ in a normed space X with $x^\circ \in \cap_{i=1}^n \Omega_i$. The following nonnegative (not necessarily finite) constants can be used for characterizing the mutual arrangement of the sets near x° [1, 2, 4, 3, 5]:

$$\theta_\rho[\Omega_1,\ldots,\Omega_n](x^\circ) = \sup\{r \ge 0 : \Big(\bigcap_{i=1}^n (\Omega_i - a_i)\Big) \bigcap (x^\circ + \rho B) \ne \emptyset,\ \forall a_i \in rB\},$$

$$\theta[\Omega_1,\ldots,\Omega_n](x^\circ) = \liminf_{\rho\to+0} \frac{\theta_\rho[\Omega_1,\ldots,\Omega_n](x^\circ)}{\rho},$$

$$\hat\theta[\Omega_1,\ldots,\Omega_n](x^\circ) = \liminf_{\substack{\omega_i \xrightarrow{\Omega_i} x^\circ \\ \rho\to+0}} \frac{\theta_\rho[\Omega_1-\omega_1,\ldots,\Omega_n-\omega_n](0)}{\rho}.$$