

Modeling and simulation of a mini AUV in spatial motion(PDF)

《船舶与海洋工程学报》 [ISSN:1002-2848/CN:61-1400/f] 期数: 2009年01 页码: 7-12 栏目: 出版日期: 2009-03-25

Title: Modeling and simulation of a mini AUV in spatial motion

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AUV; kinematics model; dynamics model; motion control; simulation

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关键词: [AUV](#); [kinematics model](#); [dynamics model](#); [motion control](#); [simulation](#)

分类号: -

DOI: -

文献标识码: A

摘要: Accurate modeling and simulation of autonomous underwater vehicle (AUV) is essential for autonomous control and maneuverability research. In this paper, a mini AUV “MAUV-II” was researched and the nonlinear mathematic model of the AUV in spatial motion was derived based on momentum theorem. The forces acting on AUV were resolved to several modules which were expressed in matrix form. Based on the motion model and combined with virtual reality technology, a motion simulation system was constructed. Considering the characteristic of “MAUV-II”, the heading control and depth control were simulated by adopting S-surface control method. A long distance traveling simulation experiment based on target planning was also done. The simulation results show that the “MAUV-II” has good spatial maneuverability, and verify the feasibility and reliability of control software.

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参考文献/REFERENCES

- [1] TIMOTHY P. Development of a six-degree of freedom simulation model for the REMUS autonomous underwater vehicle: oceans[C]// MTS/IEEE Conference and Exhibition. Honolulu, 2001: 450-455.
- [2] SU Yumin, WAN Lei, LI Ye, et al. Development of a small autonomous underwater vehicle controlled by thrusters and fins [J]. Robot, 2007, 29(2): 151-154.
- [3] YUH J. Design and control of autonomous underwater robots: a survey[J]. Autonomous Robots, 2000, 8(1): 7-24.
- [4] LIU Xuemin, XU Yuru. S control of automatic underwater vehicle[J]. Ocean Engineering, 2001, 19(3): 81-84.
- [5] LI Ye, LIU Jiancheng, SHEN Mingxue. Dynamics model of underwater robot motion control in 6 degrees of freedom[J]. Journal of Harbin Institute of Technology, 2005, 12(4): 456-459.
- [6] LI Dianpu. Ship motion and modeling[M]. Harbin: Harbin Engineering University Press, 1999.
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备注/Memo: -