Simulating an underwater vehicle self-correcting guidance system with Simulink(PDF)

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Title: Simulating an underwater vehicle self-correcting guidance system with Simulink

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摘要：   Underwater vehicles have already adopted self-correcting directional guidance algorithms based on multi-beam self-guidance systems, not waiting for research to determine the most effective algorithms. The main challenges facing research on these guidance systems have been effective modeling of the guidance algorithm and a means to analyze the simulation results. A simulation structure based on Simulink that dealt with both issues was proposed. Initially, a mathematical model of relative motion between the vehicle and the target was developed, which was then encapsulated as a subsystem. Next,steps for constructing a model of the self-correcting guidance algorithm based on the Stateflow module were examined in detail. Finally, a 3-D model of the vehicle and target was created in VRML, and by processing mathematical results, the model was shown moving in a visual environment. This process gives more intuitive results for analyzing the simulation. The results showed that the simulation structure performs well. The simulation program heavily used modularization and encapsulation, so has broad applicability to simulations of other dynamic systems.

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