A Remotely Operated Vehicle Tracking Model Estimation Using Square Root Ensemble Kalman Filter and Particle Filter

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Abstract: A ROV (Remotely Operated Vehicle) is a product of technological development that functions to perform tasks in the water. Major tasks are coral reef exploration, oil refineries, underwater monitoring, and at-sea accident rescue. The ROV or unmanned submarines have 6 degrees of freedom. In operation, the ROV requires a navigation system, that is, ROV position estimation in its diving and emerging. Some reliable motion estimation methods frequently used are the Ensemble Kalman Filter Square Root (EnKF-SR) and Particle Filter methods. The EnKF method is used to estimate the state of a dynamic system, and it is used in various fields such as meteorology, hydrology, ecology, geophysics, and robotics. Whereas the Particle Filter one is a powerful tool to handle monitoring, estimation, and prediction problems in various contexts involving uncertainty and dynamic changes. And this paper performs the ROV diving and emerging motion estimation using the EnKF-SR and Particle Filter methods. Both methods are proven to be reliable on other platforms. The simulation results in this paper showed that the EnKF method has a higher accuracy than the Particle Filter one by showing an accuracy of 98% by the Particle Filter method and an accuracy of 99% by the EnKF-SR method.

Keywords: *ROV; estimation; ensemble Kalman filter, EnKF-SR, particle filter.*

Mathematics Subject Classification (2010): 93C10, 93D05.

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