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Dynamic Fault Tree Analysis of Dynamic Positioning System through Monte Carlo Approach

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Abstract : Dynamic Positioning System (DPS) is employed in marine vessels of the offshore oil and gas industry. It is a computer controlled system to automatically maintain a ship's position and heading by using its own thrusters. Reliability assessment of the same can be analyzed through conventional fault tree. However, the complex behaviour like sequence failure, redundancy management and priority of failing of events cannot be analyzed by the conventional fault trees. The Dynamic Fault Tree (DFT) addresses these shortcomings of conventional Fault Tree by defining additional gates called dynamic gates. Monte Carlo based simulation approach has been adopted for the dynamic gates. This method of realistic modeling of DPS gives meaningful insight into the system reliability and the ability to improve the same.

Keywords : dynamic positioning system, dynamic fault tree, Monte Carlo simulation, reliability assessment
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