Mooring System Diagnosis and Structural Reliability Control for Position Moored Vessels - DTU Orbit (28/12/2018)

Mooring System Diagnosis and Structural Reliability Control for Position Moored Vessels

Early diagnosis and fault-tolerant control are essential for safe operation of floating platforms where mooring systems maintain vessel position and must withstand environmental loads. This paper considers two critical faults, line breakage and loss of a buoyancy element and employs vector statistical change detection for timely diagnosis of faults. Diagnosis design is scrutinized and a procedure is proposed based on specified false alarm probability and estimation of the distribution of the test statistics on which change detection is based. A structural reliability index is applied for monitoring the safety level of each mooring line and, a set-point chasing algorithm accommodates the effects of line failure, as an integral part of the reliability-based set-point chasing control algorithm. The feasibility of the diagnosis and of the fault-tolerant control strategy is verified in model basin tests.

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