Reliability-based dynamic positioning of floating vessels with riser and mooring system - DTU Orbit (09/11/2019)

Reliability-based dynamic positioning of floating vessels with riser and mooring system
To maintain safety of a floating vessel with associated slender components such as risers and mooring line, the vessel is normally kept within a limited region. To specify a safe position in that region, this paper suggests a new position chasing algorithm with the consideration of both riser angles and mooring line tensions. The riser angles were considered in an object function in [1] and the mooring line tension was considered in an object function in [2]. The contribution of this paper is to combine riser angle and mooring line tension together in one unified object function. A combination of scaled riser angles and structural reliability index is utilized to evaluate the “reserve capacity” relative to failure events. With this object function, the riser angles and mooring line tension are considered in a unified formulation, with higher weight added to the riser angles due to their criticality. An optimal position set-point is produced by minimization of the value of the cost function. Numerical simulations show the effectiveness of the proposed algorithm.

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