Mathieu Stability of Offshore Buoyant Leg Storage and Regasification Platform

Authors : S. Chandrasekaran, P. A. Kiran

Abstract : Increasing demand for large-sized Floating, Storage and Regasification Units (FSRUs) for oil and gas industries led to the development of novel geometric form of Buoyant Leg Storage and Regasification Platform (BLSRP). BLSRP consists of a circular deck supported by six buoyant legs placed symmetrically with respect to wave direction. Circular deck is connected to buoyant legs using hinged joints, which restrain transfer of rotational response from the legs to deck and vice-versa. Buoyant legs are connected to seabed using taut moored system with high initial pretension, enabling rigid body motion in vertical plane. Encountered environmental loads induce dynamic tether tension variations, which in turn affect stability of the platform. The present study investigates Mathieu stability of BLSRP under the postulated tether pullout cases by inducing additional tension in the tethers. From the numerical studies carried out, it is seen that postulated tether pullout on any one of the buoyant legs does not result in Mathieu type instability even under excessive tether tension. This is due to the presence of hinged joints, which are capable of dissipating the unbalanced loads to other legs. However, under tether pullout of consecutive buoyant legs, Mathieu-type instability is observed.

Keywords : offshore platforms, stability, postulated failure, dynamic tether tension

Conference Title : ICCOE 2017 : International Conference on Coastal and Ocean Engineering

Conference Location : Paris, France

Conference Dates : September 21-22, 2017