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DATA DRIVEN APPROACH TO DEVELOP A MULTIPHASE METER FROM THE FLOW INDUCED VIBRATION IN SUBSEA JUMPERS

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ABSTRACT

The measurement of the gas and liquid production from a subsea well is of the critical importance for the production optimization. This is usually done by installing multiphase meters or virtual flow meters that required calibration with certain frequency.

All subsea wells are equipped with jumpers to absorb the deformation of the pipes due to temperature and pressure changes. Jumpers are flexible or rigid pipe sections that connect various subsea components, such as wells, manifolds, risers, and flowlines. The dynamics of the gas and liquid through the jumper generates structural vibrations which depend on the liquid and gas flowrates.

Understanding the relationship between flowrates and their subsequent vibrations, it will be possible to estimate the well production from the vibration measurements. This study evaluates the possibility of creating an inverse model to estimate flow rates based on signals generated in an experimental facility. Signals acquired by different sensors are used to train a model capable of predicting the flow rate from the acquired signals.

This session involves the use of technology and data driven approach to study the multiphase production techniques in an environment with high vibration response and strong structural integrity requirements.