

Statistical Modelling of Metocean Environmental Contours for a Target Site

The proposed master thesis aims to develop a robust statistical tool for estimating site-specific environmental contours based on long-term metocean data. The tool will model the joint variability and dependence structure of key environmental parameters, such as wind speed, current speed, significant wave height, and characteristic wave periods (T_e/T_p), and use these models to derive environmental contours suitable for reliability and design analyses. Different statistical approaches for extreme value and joint probability modelling will be compared and implemented in a flexible framework, allowing the user to select appropriate models and confidence levels for a given site. The final outcome will be a validated, documented tool capable of generating environmental contours and associated design conditions, together with example applications for a selected case study location.