Spectral element FNPF simulation of focused wave groups impacting a fixed FPSO-type body - DTU Orbit (17/10/2019)

Spectral element FNPF simulation of focused wave groups impacting a fixed FPSO-type body

A 3D fully nonlinear potential flow (FNPF) model based on an Eulerian formulation is presented. The model is discretized using high-order prismatic – possibly curvilinear – elements using a spectral element method (SEM) that has support for adaptive unstructured meshes. The paper presents details of the FNPF-SEM development, and a model is illustrated to exhibit exponential convergence for steep stream function waves to serve as validation. The model is then applied to the case of focused waves impacting on a surface-piercing, fixed FPSO-like structure. Good agreement is found between numerical and experimental wave elevations and pressures.

General information
Publication status: Published
Organisations: Center for Energy Resources Engineering, Scientific Computing, Department of Applied Mathematics and Computer Science, Research Institutes of Sweden
Contributors: Engsig-Karup, A. P., Eskilsson, C.
Pages: 141-148
Publication date: 1 Jun 2019
Peer-reviewed: Yes

Publication information
Volume: 29
Issue number: 2
ISSN (Print): 1053-5381
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
Original language: English
Keywords: Focused wave, FPSO, Fully nonlinear potential flow, High-order numerical methods, Spectral element method, Unstructured meshes, Wave–body interaction
DOIs:
10.17736/ijope.2019.jc753
Source: Scopus
Source ID: 85068934129
Research output: Contribution to journal › Journal article – Annual report year: 2019 › Research › peer-review