Geoscientific

Model Development

Discussions

Open Access

[GMDD]

Interactive

comment

Interactive comment on "On Quadruplet Interactions for Ocean Surface Waves" *by* Adhi Susilo et al.

Anonymous Referee #2

Received and published: 8 January 2018

The manuscript addresses some details of computing nonlinear four-wave interactions for ocean surface (gravity) waves. In fact, the paper only addresses details of the structural reduction of the multi-dimensional integration space, and as such represents only a detail of a detail of the technical issues occurring with calculating these interactions, making it a niche paper indeed. With that, one could argue that this should be a technical report, rather than a scientific paper, not in the last place, as this manuscript seems a little incomplete with respect to the results. Having said that, the manuscript is well written and easy to follow, and its results may be useful for the small group of researchers working on the full Boltzmann integral version of these interactions. Below are some more detailed remarks on the manuscript

1. I agree with Klaus Hasselmann in his comments on this paper that the references

in the introduction are insufficient. Only using the Webb (1978) reference does not give due credit to Klaus (and Owen Phillips and Vladimir Zakharov) regarding their fundamental contributions to this field. And a reference only to the authors' two-scale approach does not give due credit to the plethora of newer Snl approaches, some of which have even found their way into operations at NOAA. This does not influence the core of the paper, but it represents unnecessary discourteousness.

2. At its core, the present manuscript seeks to remove the need for iterations in solving the dispersion relation as needed for determining integration loci. I wonder if this could be achieved even easier by using the non-dimensional interpolation table used inside of WAVEWATCH III. Have the authors considered this approach, and how would that approach compare to the new method both in cost and accuracy? Looking at the code, the cost seems much smaller, and the relative accuracy should be assessed without much effort, and the code used in WAVEWATCH III is written as a self-sufficient package than can be used in any code.

3. The manuscript is incomplete. The new method is advertised as more accurate and cheaper. The accuracy is quantified, but the cost is not. The cost aspect is likely more convincing for its use by others. How much cheaper would the entire exact interaction be with the new approach? Considering the experience of the authors with the Resio codes for exact interactions, it seems a small effort to actually compare the cost of this Snl package with the old and new approaches, both for calculating interactions for a given spectrum, or for full model integration with all source terms.

4. OK, this last observation may well be taken as being a little over the top. Snl in its exact form is very sensitive to details of computations. I would love to see some proof that the interactions obtained with the new approach indeed are realistic without unexpected features or noise, and that they result in stable model integration. I expect that changing these technical details will have little impact on the resulting interactions or model integrations, but past experience has taught me to be overly suspicious in this respect.

C2

GMDD

Interactive comment

Printer-friendly version

Discussion paper