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

Anonymous Referee #1

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The authors describe a method for solving an equation used to determine the integration space for computing the non-linear four-wave interactions between wind-generated surface waves. The motivation of this research is highly flawed as the authors suggest the existence of a problem, which has already been solved satisfactorily more than 10 years ago. So, the manuscript offers a so-called solution for a non-existing problem. The only new element in this research is a mathematical detail avoiding iteration, but still offering a non-exact solution. Further, the manuscript contains some misquotations and various wrong statements and even a wrong figure. Based on these general remarks and some further issues detailed below I recommend a reject.

The manuscript describes a method for determining the position of the loci for k2 and k4 appearing in the WRT method for computing these interactions. For deep water,

explicit relations already exist, so this work does no add anything new. For shallow water, robust iterative methods exist, despite unbacked claims by the authors about poor convergence.

The work is not reproducible as for almost all figures no details are given about the chosen variables like k1, k3, step size, and depth.

Page #1. The title is incorrect. Not one interaction is solved. The manuscript only describes a mathematical detail offering a different method. Any consequence of their work on quadruplet interaction for ocean surface waves is missing. There is only some wild speculation that their method is important for wind-wave modelling and its applications.

#2/6: excessively large is a wild exaggeration. No reference or quantification is given. Further, the authors completely miss the fact that finding the integration space is only part of a pre-processing, whose time vanishes in comparison with applying the full integration method.

#2/22: No criterion is given for better performance.

#3/12: stating that the downshifting of the peak requires re-computation of the integration space is not needed. The authors define a non-existing problem. But, if there is need for such a re-computation, than proper references should be added.

#4: For deep water, exact relations exist for determining the position of the loci. So, this work does not add anything new.

#5, Fig 1: Details are missing of k1, k3 and depth. So this is not reproducible

#8/Figure 2: it is impossible that the shallow water egg-wise locus extends outside the circle through rmin and rmax.

#10/10: The authors claim to have an accurate result without iteration. This is still not an exact answer and no criterion is given. It is still an approximation.

#12, No details are given about step sizes in creating a the points on the locus.

#13: In Resio and Perrie (2008) no mention is made of any method determining the loci, let alone the number of iterations needed. The number 200 is a wild statement without any background information on the method applied or accuracy criterion applied. This misquotation is a severe flaw of this manuscript.

#14: the results in the figures 7 and 8 are anecdotal. It is just one example and possibly out of context. It is also a matter of choosing a scale to magnify any difference without a quantitative context.

#14/3. No reason is given why the residue should be zero. In numerical modelling, and considering the whole chain of steps needed to compute the full Boltzmann integral, errors appear at various levels, and it requires much further research to determine any effect on the total result, whatever that might be.

#15 The phrase 'this is important' is not substantiated.

#16/6: The statement that the Snl method implemented in Wavewatch III and SWAN only considers deep water is wrong.

#16: the last 5 lines are true in itself, but these have no relation with the work presented in this manuscript.