

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

K. Hasselmann

klaus.hasselmann@mpimet.mpg.de

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The authors propose an improved technique for computing the rather complex integral expression describing the nonlinear energy transfer in an ocean wave spectrum. The integral transfer expression was derived and first computed by myself (J.Fluid Mech, 12, 481-500, 1962, and JFM, 15, 385-398, 1963, respectively). (The integral expression itself was first published in 1960, in Schiffstechnik, as yet without computations.). More detailed computations were later performed in the context of the JONSWAP wave growth field experiments (Hasselmann et al, 1973, Deutsche Hydrographische Zeitschrift, A8, 12, 1973).

The authors, however, give no reference to the origin and original computations of

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the nonlinear energy transfer: their earliest citation is of a paper by Webb (Deep Sea Research, 1978).

I should, of course, ignore my vanity and simply comment on the paper regarding its new results. However, here I must confess that I am no longer motivated today to look again into the complexities of the higher dimensional nonlinear energy transfer integration and the removal of the associated delta-functions. This is basically straightforward mathematically but algebraically tiresome. On the other hand, it is indeed a necessary task, since the nonlinear transfer has been shown to be the dominant process governing the form of the windsea spectrum. With the enormous advances in computer power since our first exact computations in 1962 I have always been surprised that the later Direct Interaction approximations we introduced for operational wave models in 1988 (this is at least cited, J. Phys. Ocean. 18, 1988) have not yet been replaced by more exact numerical integrations.

Glancing through the paper diagonally I tend to agree with an earlier reviewer: the proposed exact numerical integration needs to be tested for its operational viability through an actual application in an operational wave model, for example at the European Centre for Medium Range Weather Forecasts. If this is carried out, and a more balanced history of the problem is presented (and ignoring my subjective feeling that the authors are making the numerics appear still more complicated than they actually are) I recommend publication.

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