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The role of the modulational instability in the interaction of waves and currents

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It has been established in the past that the modulational instability is one of the mechanisms responsible for the formation of extreme waves. Its role in the presence of the current is still not completely understood. Recent numerical simulations (Hjelmervik and Trulsen, JFM 2009 637) of a current modified NLS equation have shown very interesting results, however the role of the modulational instability in the presence of current has not been clarified.
Here we use the same model as in the aforementioned paper and performed a detailed study on how and when the modulational instability is triggered by a current. A linear stability analysis is also performed.