

## **The Modulational Instability in the Presence of Damping**

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The discovery of solitons by Zabusky and Kruskal in 1965 revolutionized nonlinear physics. About the same time, several people in several fields discovered the modulational instability (or "Benjamin-Feir instability"), and this discovery also changed nonlinear physics in fundamental ways. In recent work, we have explored how damping affects this instability, both mathematically and experimentally. Mathematically, we have found that modulational instability changes fundamentally in the presence of damping: damping (of the right kind) stabilizes the instability. Experimentally, we observe stable wavetrains within the lengths of our wavetanks, and we find that the damped theory predicts measured wave data much more accurately than earlier theories. The talk concludes with some consequences of this revised thinking about the modulational instability. [Several people participated in the research described herein, especially Diane Henderson of Penn State University.]