

# Numerical study of nonlinear wave models with SpecTraVVave

**Daulet Moldabayev\*** and **Henrik Kalisch**

Department of Mathematics, University of Bergen

Postbox 7800, 5020 Bergen, Norway

*daulet.moldabayev@math.uib.no, henrik.kalisch@math.uib.no*

**Olivier Verdier**

Department of Mathematics and Mathematical Statistics, Umeå University, Sweden

*olivier.verdier@math.umu.se*

## Abstract

SpecTraVVave is a Python-powered program package, which uses cosine collocation method [2]-[3] to solve a broad class of nonlinear dispersive equations such as Korteweg-de Vries and Whitham. Wave models are defined by a nonlinear flux function, a linear dispersion operator, and their solutions are specified by the boundary condition and the wavelength. Boundary conditions enable computing traveling-wave solutions and soliton-like solutions, which can be then tested with an evolution integrator.

The SpecTraVVave package is capable of storing solutions for wave models. Thus, one may study features of amplitude-velocity bifurcation curves of the solutions. In this regard, termination of existence and inversion of stability of solutions prompt a special interest [4]-[5].

Results of numerical study of a number of nonlocal wave equations such as the Whitham equation and Benjamin-Ono equation [1] are presented. An example of interaction of solitary wave solutions of modified Benjamin-Ono equation is provided.

The SpecTraVVave package is available online at the github portal.

## References

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