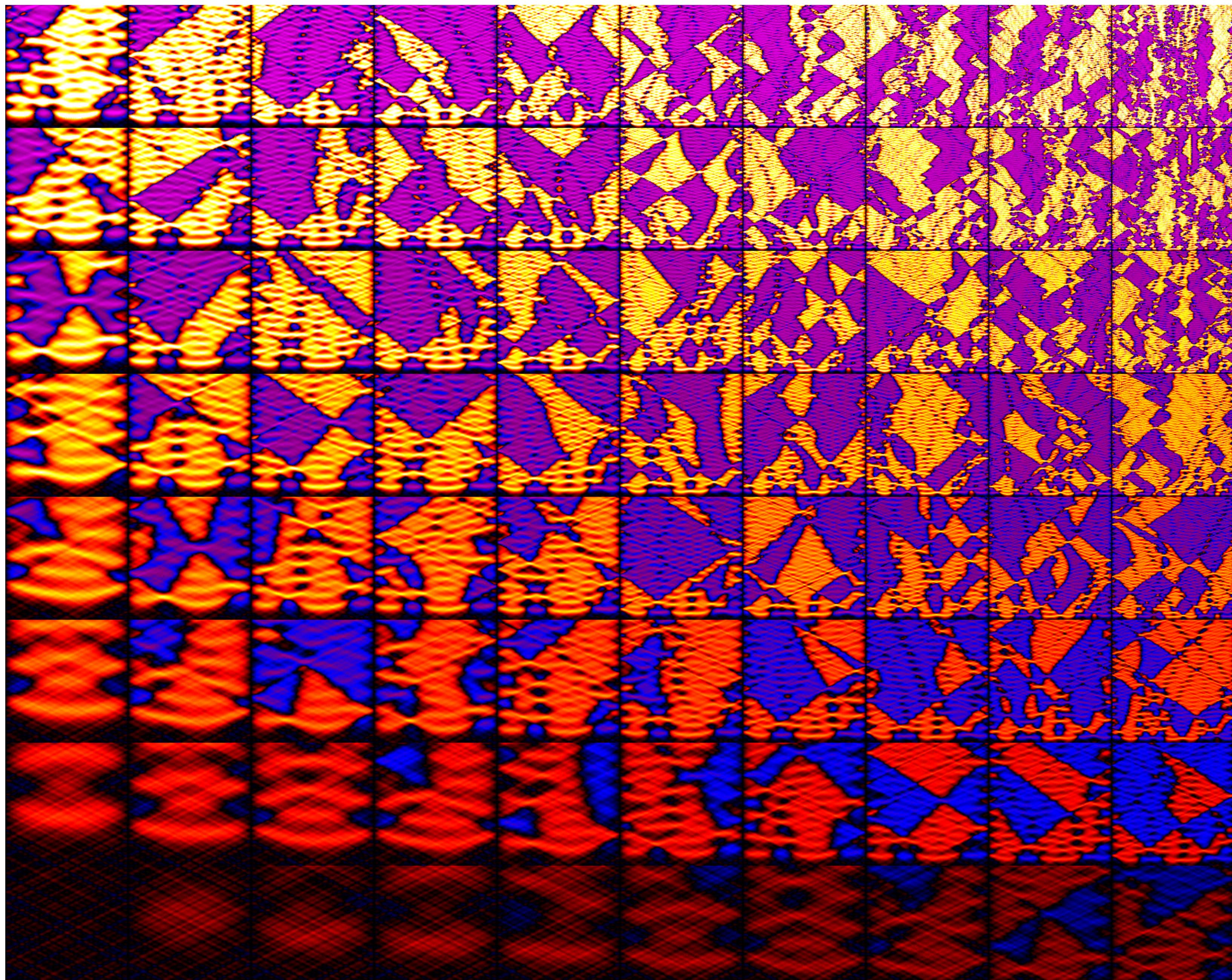


WOLFRAM SUMMER SCHOOL 2023

Exploration of Symmetric Nonlinear Wave Equations

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GOAL

This project investigates the solutions to the PDE:

$$\partial_t^2 u(t, x) = \partial_x^2 u(t, x) + f(u(t, x)) \text{ for } f(u(t, x)) = -a(u(t, x) + b)(u(t, x) - b)u(t, x)$$

SUMMARY OF RESULTS

Interesting structures are observed in numerically computed $u(t, x)$ solutions, their features are analyzed for different a and b parameters. Time-independent version of the equation is studied and solutions are used as initial conditions - leading to non-stable equilibrium states.

