Wave simulation: Matlab

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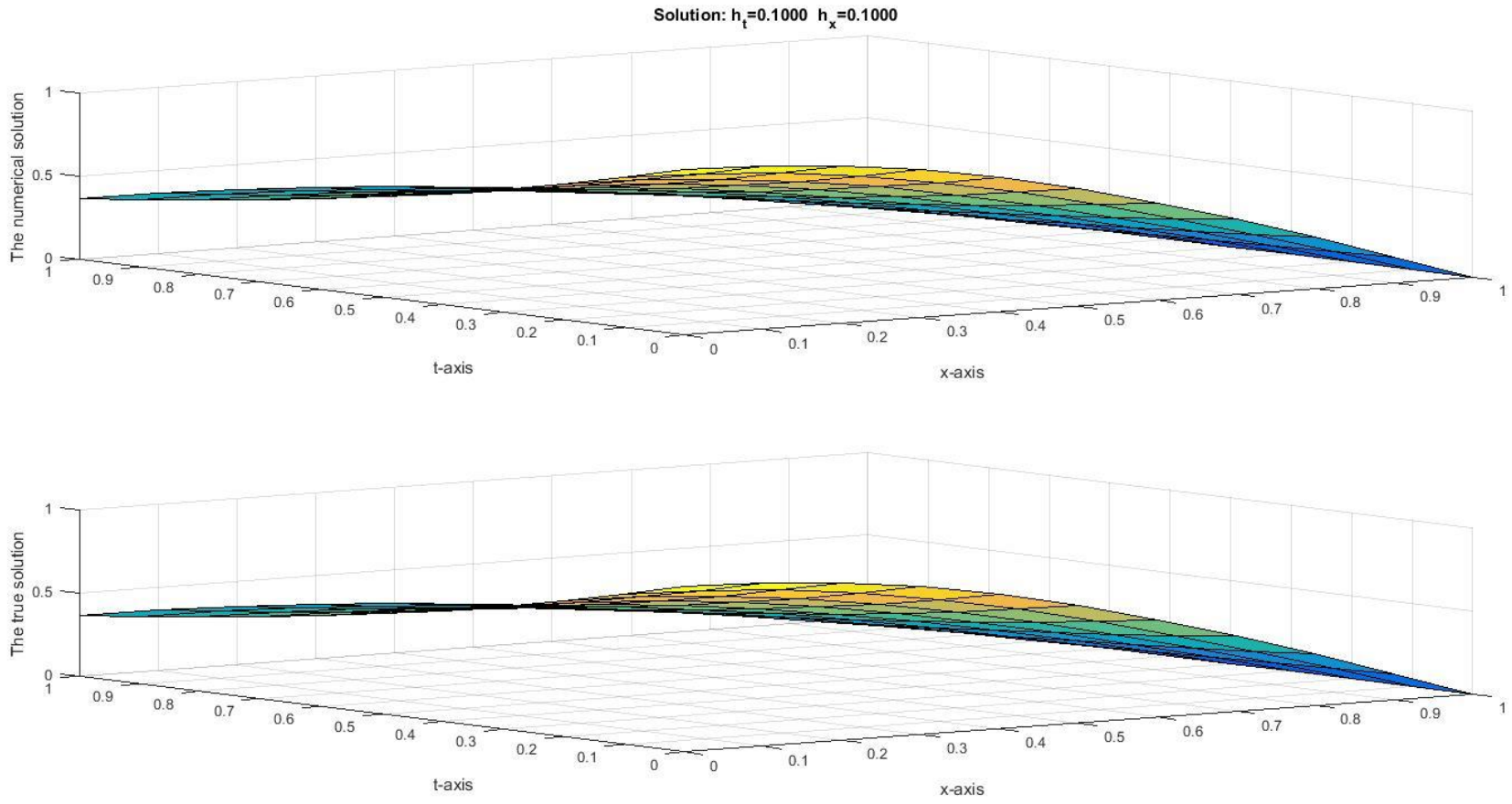
Wave

Second order hyperbolic equation:

$$\frac{d^2u}{dt^2} = a\frac{d^2u}{dx^2} + f$$

This describes one-dimensional wave propagations, as well as a variety of other physical processes. We can utilize this to solve the initial boundary value problem as well.

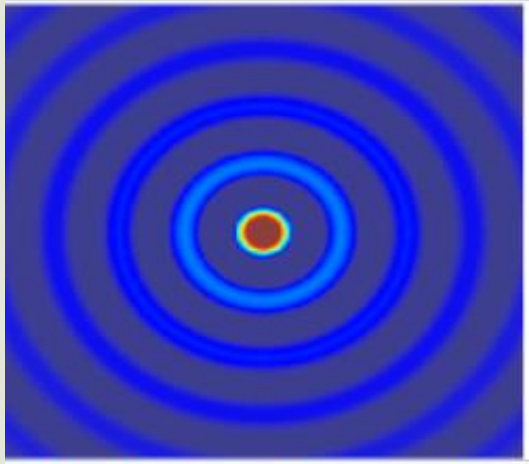
True and numeric solution to question 9, page 489



Features of wave equation:

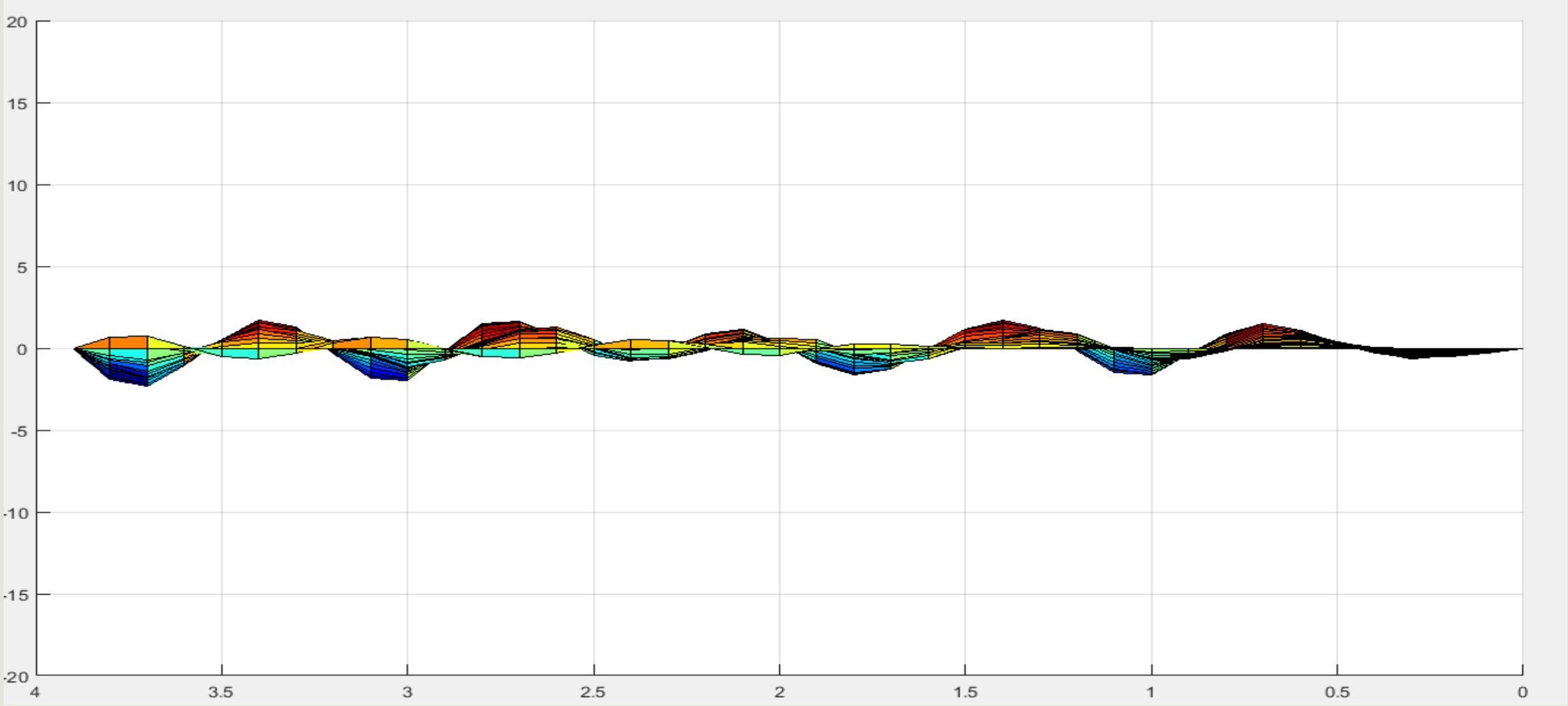
- The **wave equation** is an important second-order linear partial differential equation for the description of waves
- Practically, wave equation can be derived for the case of a string that is vibrating in a two-dimensional plane, with each of its elements being pulled in opposite directions by the force of tension
- Also based on theory of elasticity.

A pulse traveling through a string with fixed endpoints as modeled by the wave equation.



Spherical waves coming from a point source.

Side view of the Sine wave.



Top view of sine wave: