

# Assignment-4

MM21B046

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## Wave equation

$$\frac{\partial^2 u}{\partial t^2} = c^2 \nabla^2 u$$

The (two-way) wave equation is a **second-order linear partial differential equation for the description of waves or standing wave fields** — as they occur in classical physics — such as mechanical waves (e.g. water waves, sound waves and seismic waves) or electromagnetic waves (including light waves). It arises in fields like acoustics, electromagnetism, and fluid dynamics. A single wave propagating in a pre-defined direction can also be described with the one-way wave equation.

Table 1: Table representing the symbols used and their description

Symbols used	Description of the symbols
$u$	Amplitude of the wave
$t$	time
$c$	speed of the wave
$\nabla^2$	Laplacian operator

Figure 1: A 2D water wave



Figure 2: A solution to 2D wave equation



The above is a .gif. It can be viewed only in a pdf reader which can render videos like okular, evince, etc

## References:

[https://en.wikipedia.org/wiki/Wave\\_equation#:~:text=The%20\(two%2Dway\)%20wave,waves%20\(including%20light%20waves\).](https://en.wikipedia.org/wiki/Wave_equation#:~:text=The%20(two%2Dway)%20wave,waves%20(including%20light%20waves).)