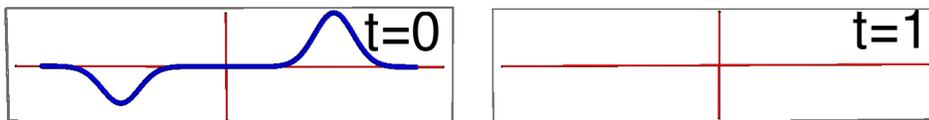
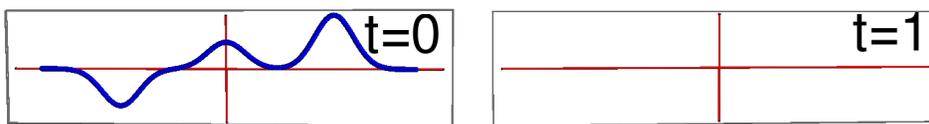


Unit 12: Partial differential equations

- 1 Verify that $f(t, x) = 2tx + t^2 + x^2$ satisfies the wave equation $f_{tt} = f_{xx}$.
- 2 Let us assume that $f(t, x)$ satisfies the transport equation $f_t = f_x$ and that $f(0, x)$ is given in the picture to the left. Can you predict, how $f(1, x)$ looks like?



- 3 Let us assume that $f(t, x)$ satisfies the heat equation $f_t = f_{xx}$ and that $f(0, x)$ is given in the picture to the left. Can you sketch, how $f(1, x)$ looks like?



- 4 In the Book "In Pursuit of the Unknown", the English mathematician **Ian Stewart** covers 17 equations. Some of the are partial differential equations. One of the following equations appears on the cover of that book. Which one?

	Transport
	Burgers
	Heat
	Wave



- 5 Finally see whether you can recognize some other equations or formulas on that book cover illustration.