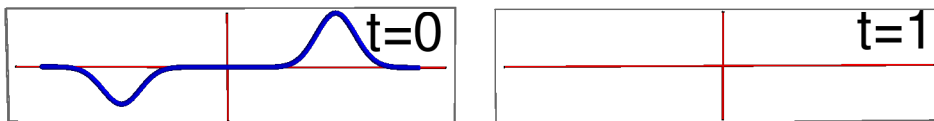
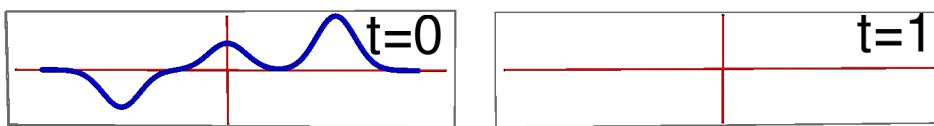


## Unit 12: Partial differential equations

- 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.