AMATH 353: Homework 1

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April 3, 2018

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Part 1.)

a.) To create a wave moving left with speed one, I used the equation

$$u(x,t) = exp(-x - ct)^2) \tag{1}$$

with $c = -1$. The following figure displays its movement to the left over time with a speed of 1.
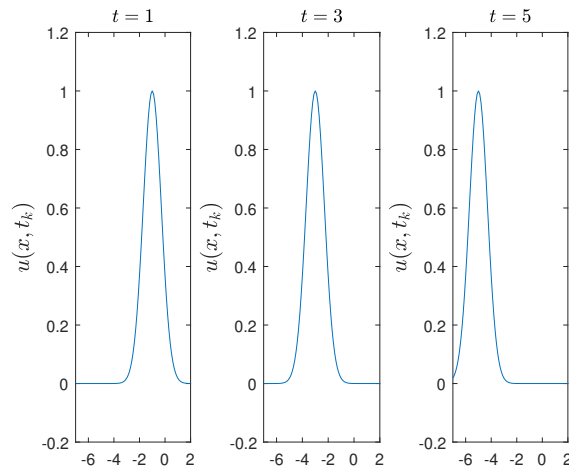

Figure 1: Moving left with speed 1.

b.) and c.) Parts b.) and c.) were executed with the following values for c in the same equation used on part a.), which I have accompanied with visualizations. Note that the 'speed' is displayed by the identical figures and increasing or decreasing x-axes.
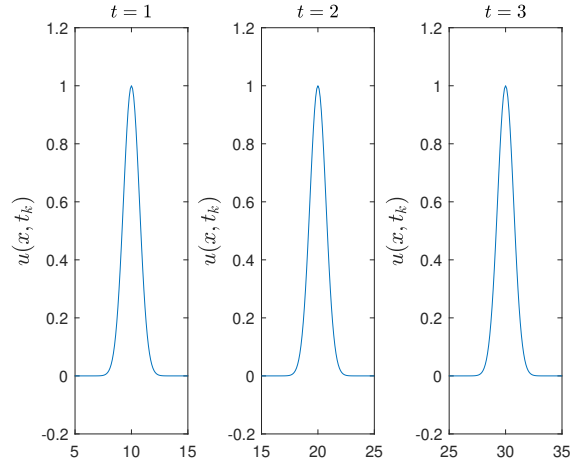
1

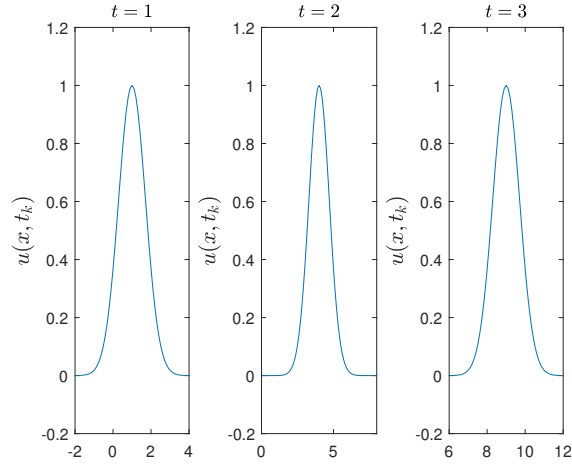Figure 2: $c = 10$, moving right with speed 10.

Figure 3: $c = t$, moving right with speed t^2.

d.) Part d.) modifies the equation in a.) to implement decreasing amplitude inversely proportional to t.

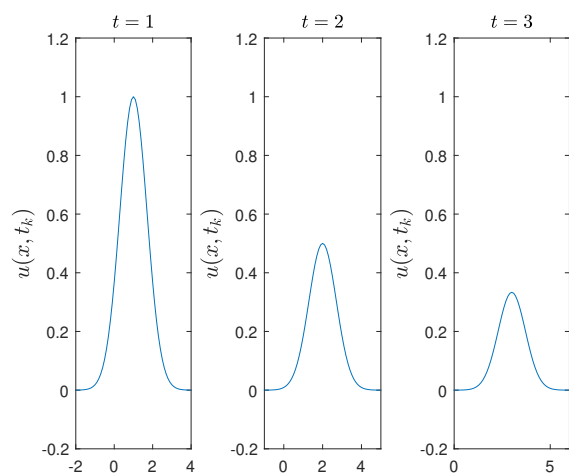$$u(x,t) = \frac{1}{1+t}exp(-x-ct)^2) \tag{2}$$

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Figure 4: $c = 10$, moving right with speed 1 and amplitude inversely proportional to t.)