

Physics 1111: Lab 10

Waves

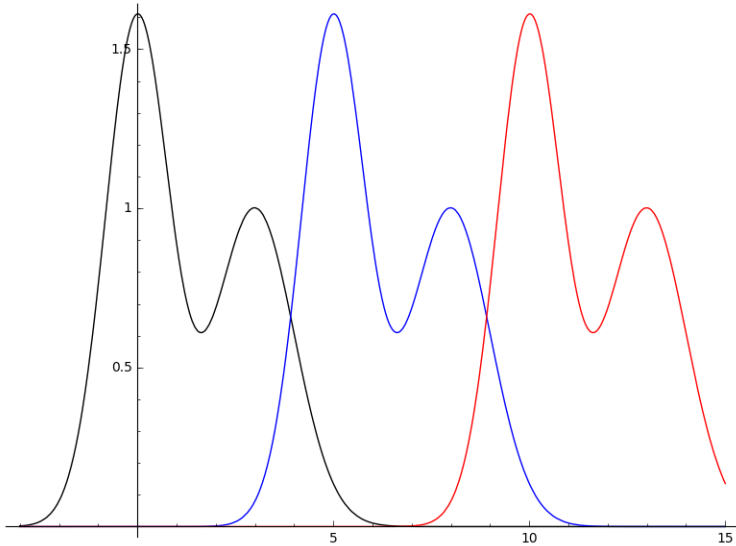
In this lab you will use software to model wave motion.

Part 1

At $t = 0$ a wave is given by

$$y(x) = 1.6e^{-0.75x^2} + e^{-0.5(x-3)^2} \quad (1)$$

and moves to the right with speed v . Choose a value for v (anything besides 5 m/s since that is used in the example figure below) and create a plot showing the wave at $t = 0, 1$, and 2 s.



Do this by modifying the SageMath starter code below.

```
y1, y2, y3, x = var("y1, y2, y3, x")
```

```
y1 = x + 1
y2 = x^2
y3 = x^3 - 1
```

```
p1 = plot(y1, (x, -2, 2), color="black")
p2 = plot(y2, (x, -2, 2), color="blue")
p3 = plot(y3, (x, -2, 2), color="red")
```

```
g = Graphics()
g += p1
g += p2
g += p3
g.show()
```

Part 2

Now create an animated version of the plot from part 1. Save the animated .gif file and upload it to GitHub when you submit your lab. Use the code below as a starting point.

```
traveling_wave = [plot(exp(-(x - t)^2), (-1, 4), ymin=0, ymax=2) for t in xrange(0, 5, 0.1)]
```

```
animation = animate(traveling_wave)
animation.show(delay=10)
```

Part 3

Create an animation of a right-moving wave interfering with a left-moving wave.