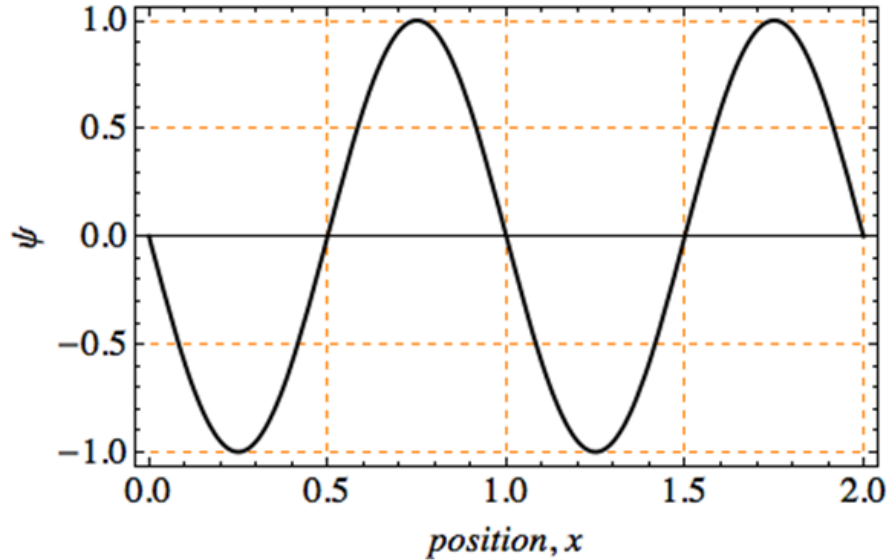


## Dispersion Relation for Waves on a String

Here is a snapshot of a harmonic wave in a rope. The snapshot is taken at  $t = 0$ . After time  $t = T$ , it will look the same again.



Group A: This wave is traveling to the right.

Group B: This is a standing wave.

For the various times given,

- where is the KE density maximal and minimal? Why?
- where is the PE density maximal and minimal? Why?
- what are the maximal and minimal values of the KE density and PE density?
- plot and animate the kinetic energy density, potential energy density and total energy density. (We may leave this part to the full-class discussion).

1.  $t = 0$
2.  $t = T/4$
3.  $t = T/2$
4.  $t = 3T/4$

Your group will start with one of the 4 times: when you finish, move on to the next time, swapping roles of taskmaster, cynic, & recorder. If you finish all the times and the plot for your group, take on the other group's assignment.

by Janet Tate  
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