

May 4, Week 15

Today: Chapter 15, Waves

Homework #11 due Monday, May 7 at 11:59pm
Mastering Physics: 5 problems from chapter 13
Written: none.

Final Exam, Wednesday, May 9, 10:00-12:00 AM.

Practice exam on website and problems on mastering physics.

Review Sessions, Monday and Tuesday afternoon.

Monday: 1:00-2:00, Regener Hall 144

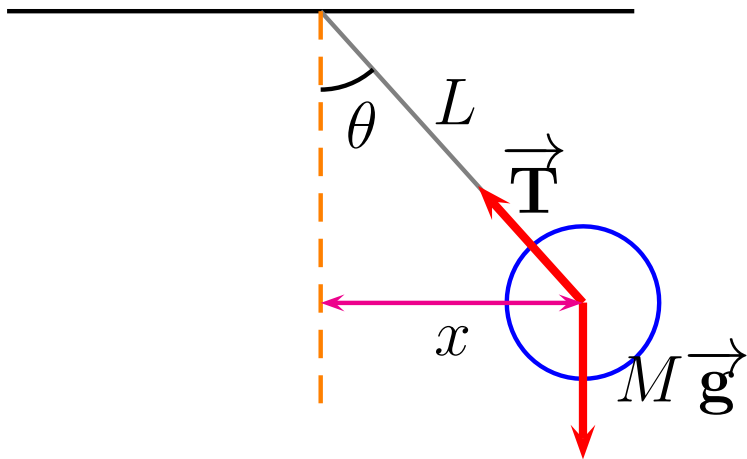
Tuesday: 1:00-2:00, Dane Smith Hall 120

Pendulum II

Under the right conditions, a pendulum will undergo simple harmonic motion.

First Condition: No friction.

Simple Pendulum - Massless connector



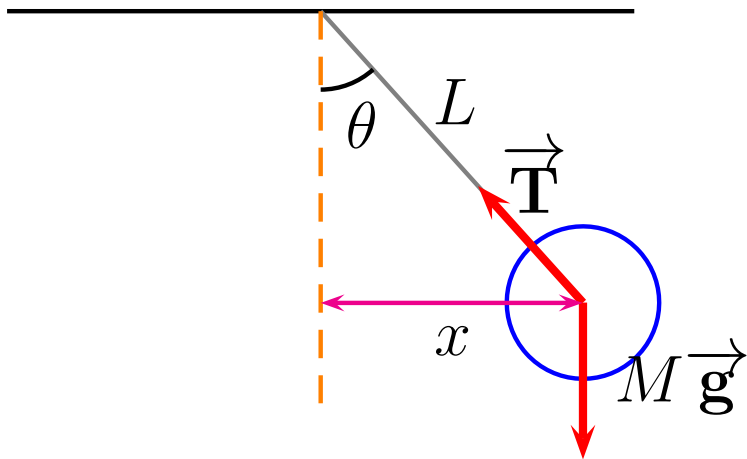
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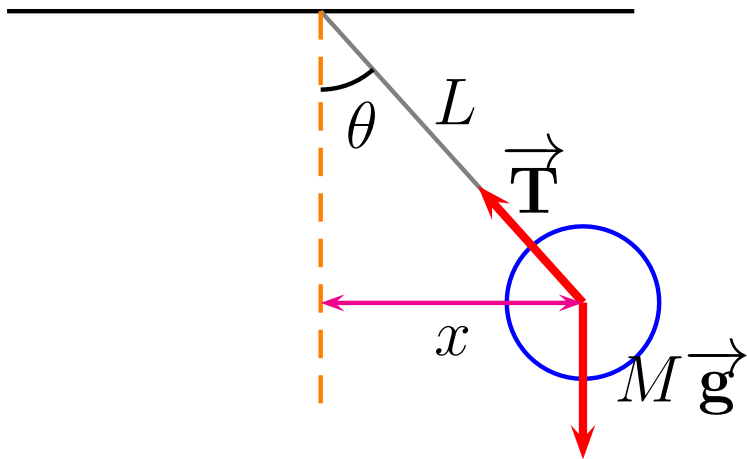
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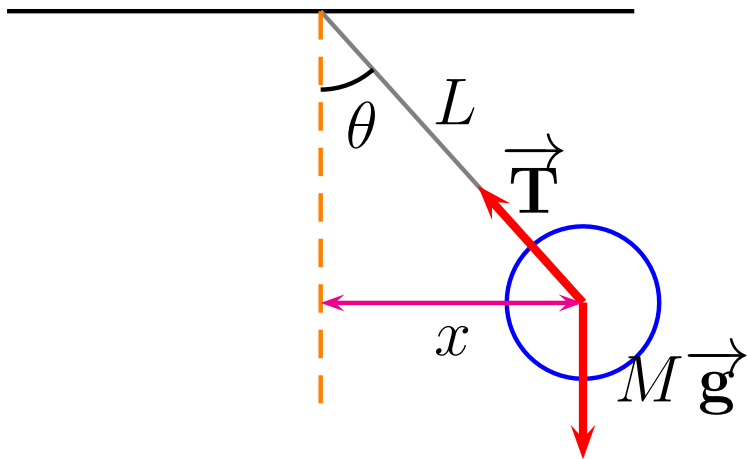
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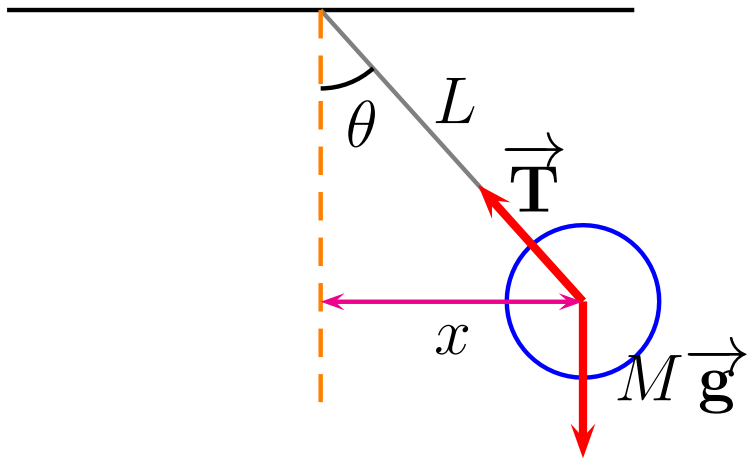
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True equation
for pendulum

Small Angle Approximation

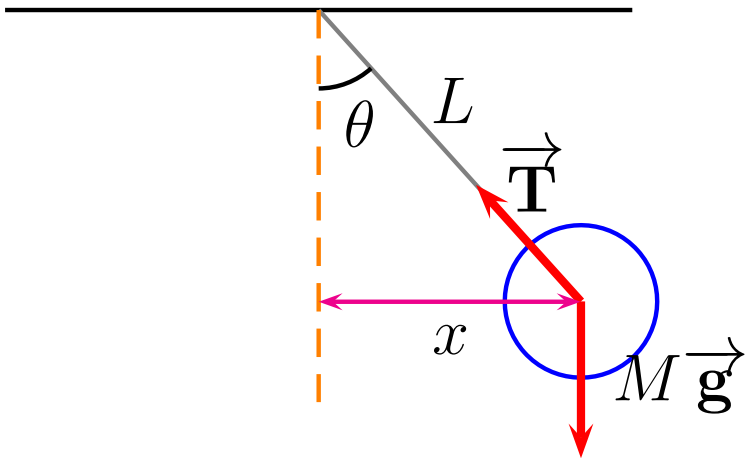
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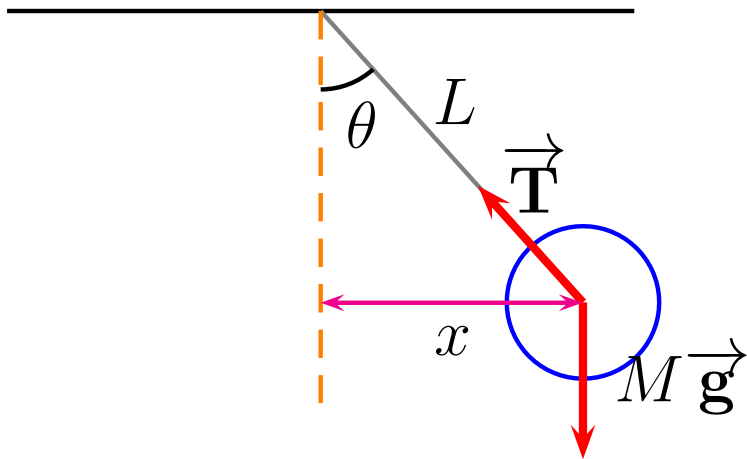
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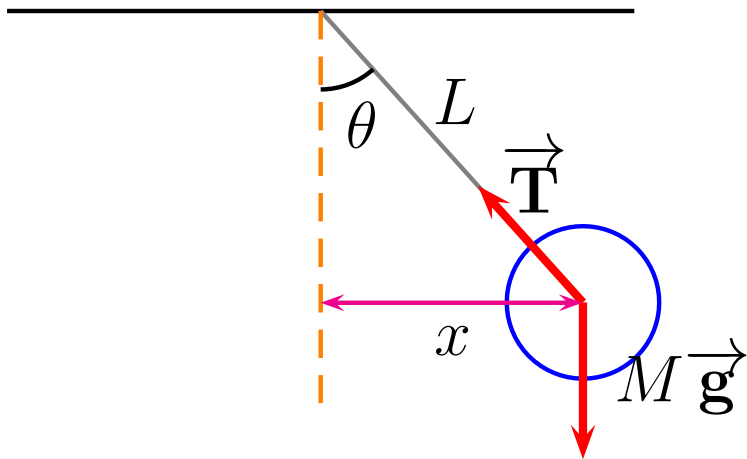


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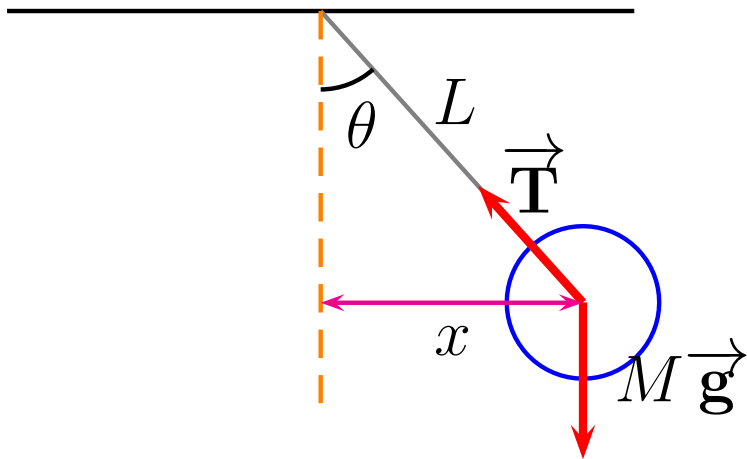
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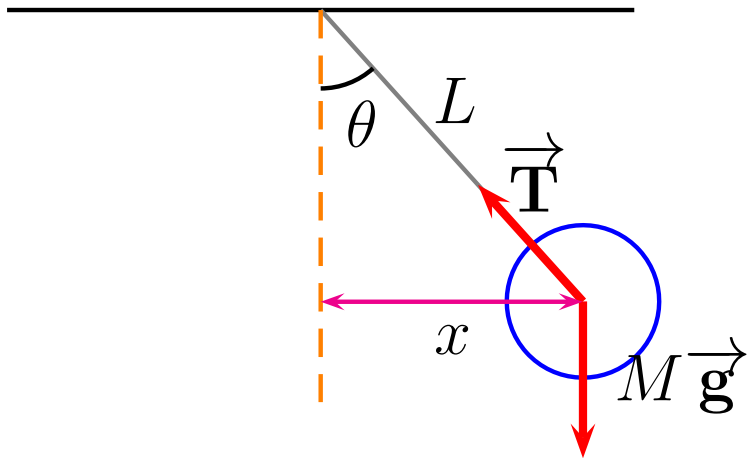


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$$\omega = \sqrt{\frac{g}{L}}$$

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Rolling Waves - A combination of transverse and longitudinal

Periodic Waves

The simplest type of wave is one for a frictionless and infinitely-long medium in which each point of the medium undergoes Simple Harmonic Motion.

Periodic Waves

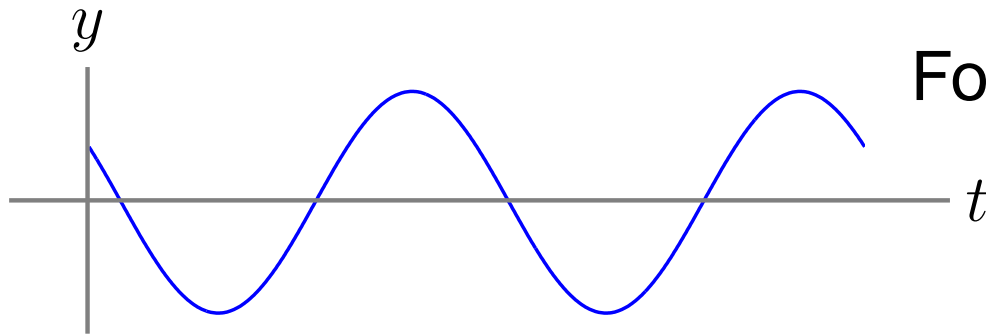
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For a point on the medium

Periodic Waves

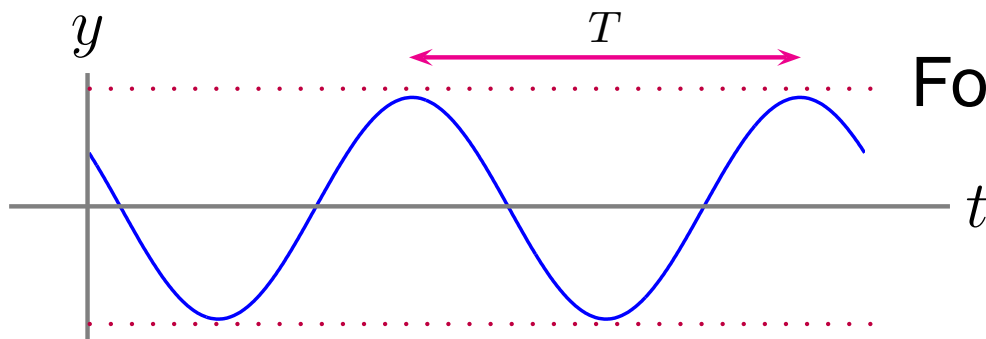
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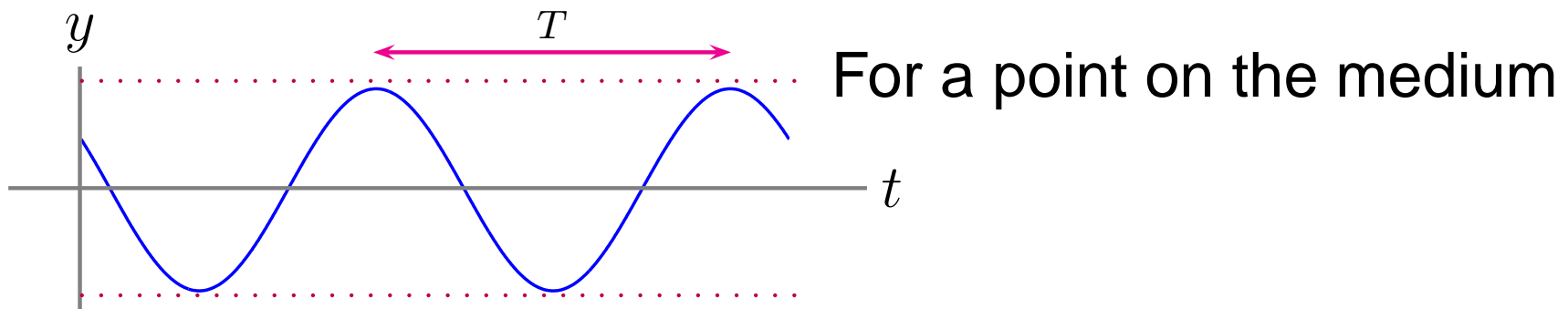
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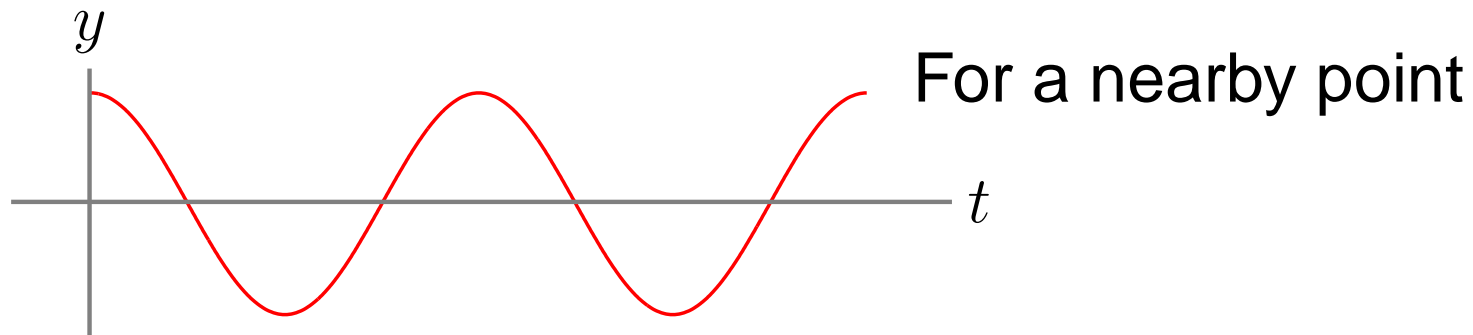
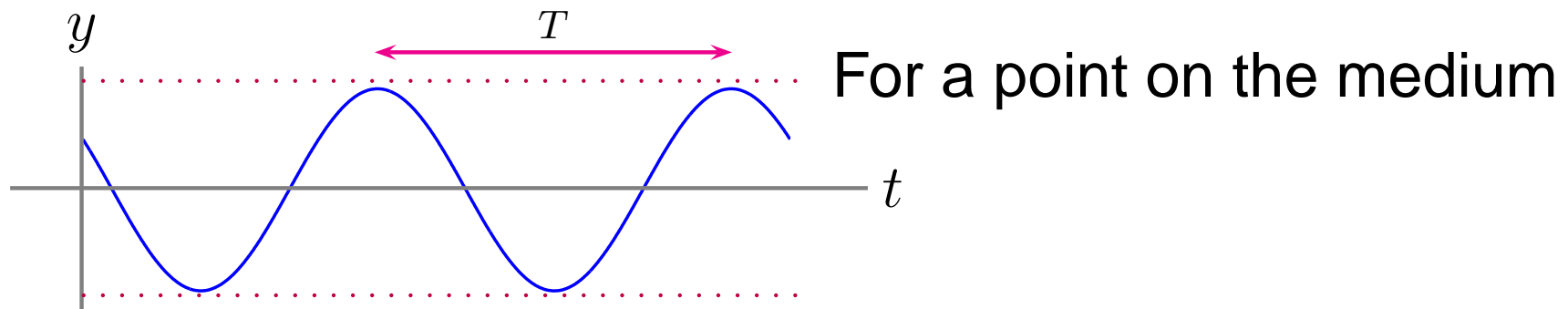
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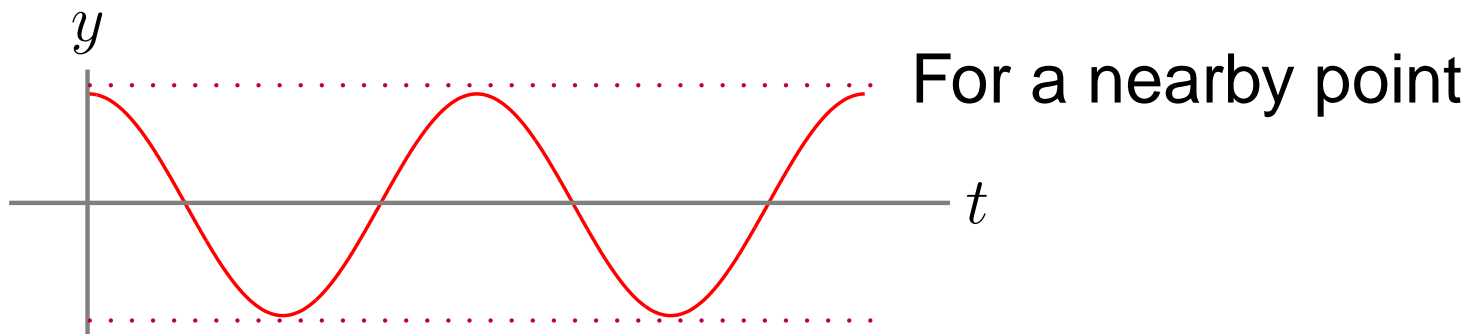
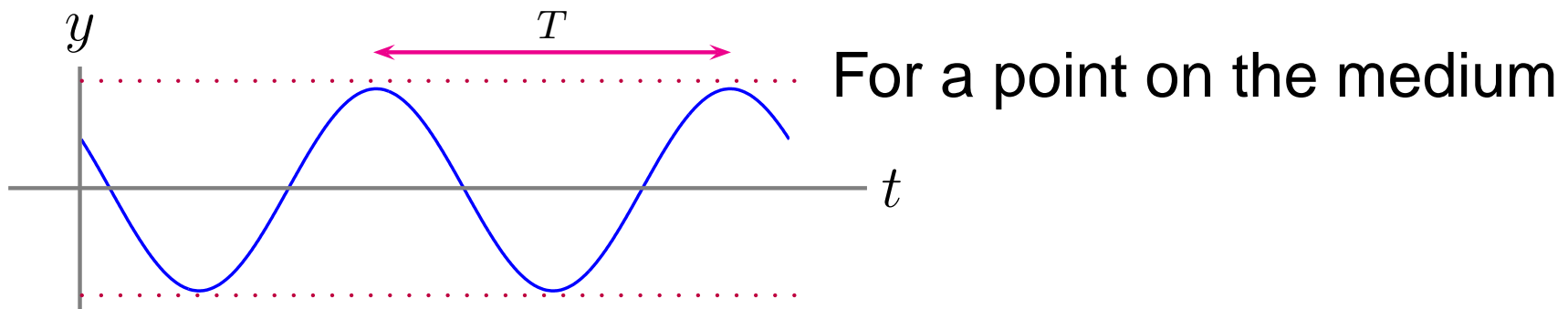
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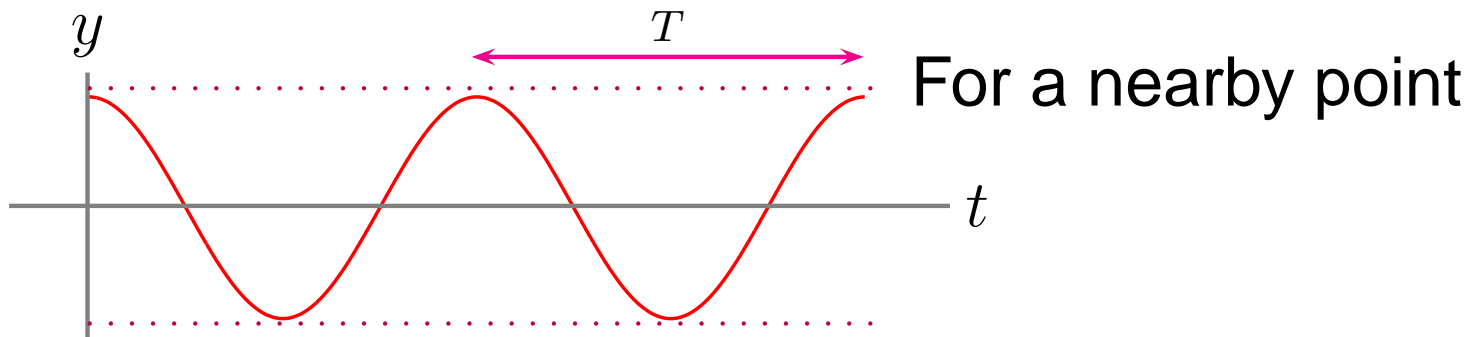
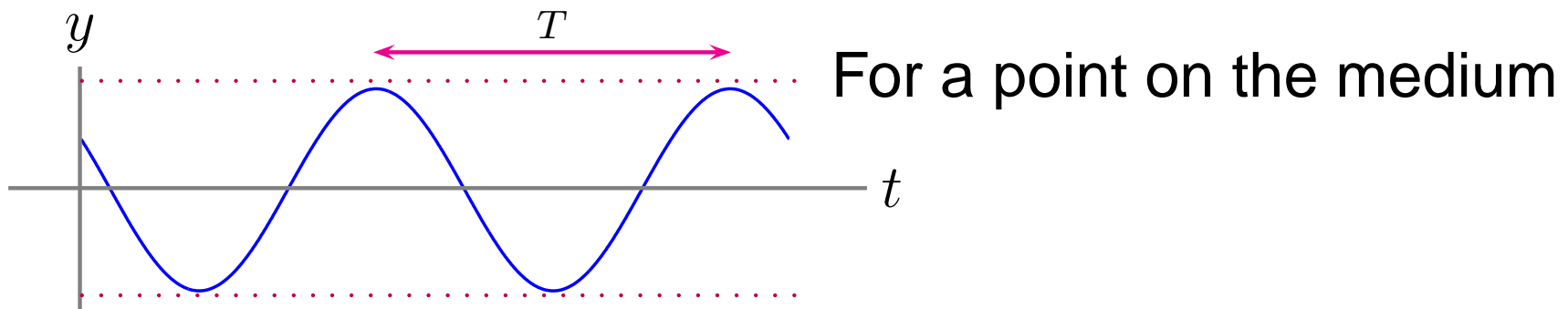
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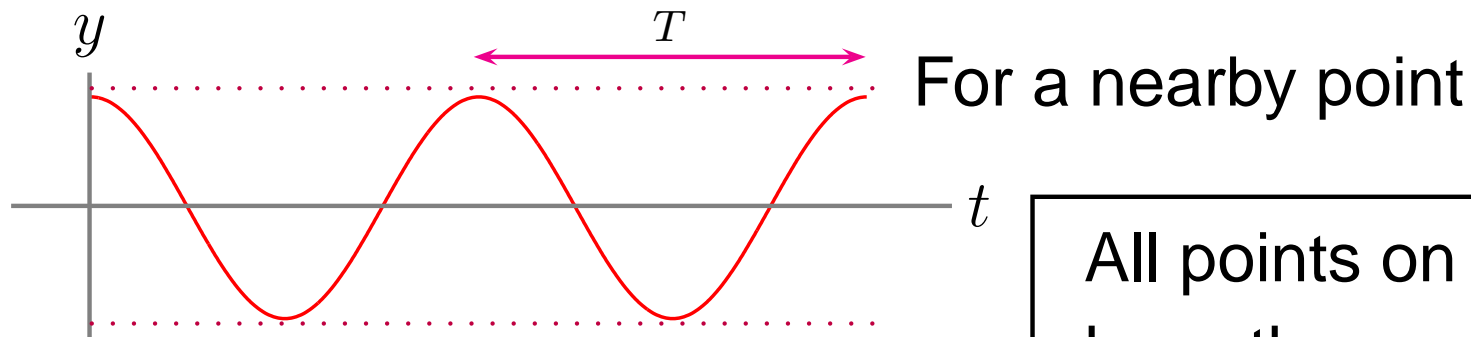
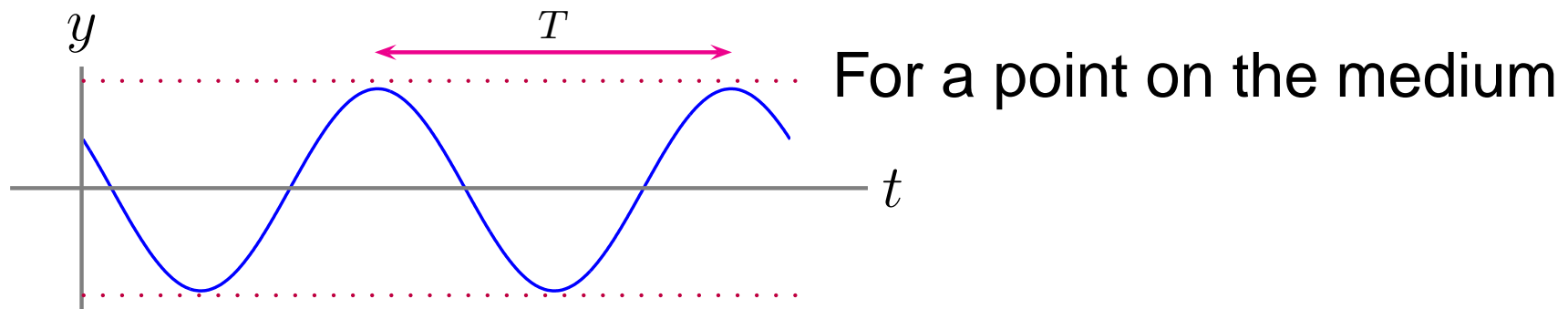
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All points on the medium
have the same period

Wavelength

While points near each other on the medium are not in phase, over some distance there are synchronized points.

Wavelength

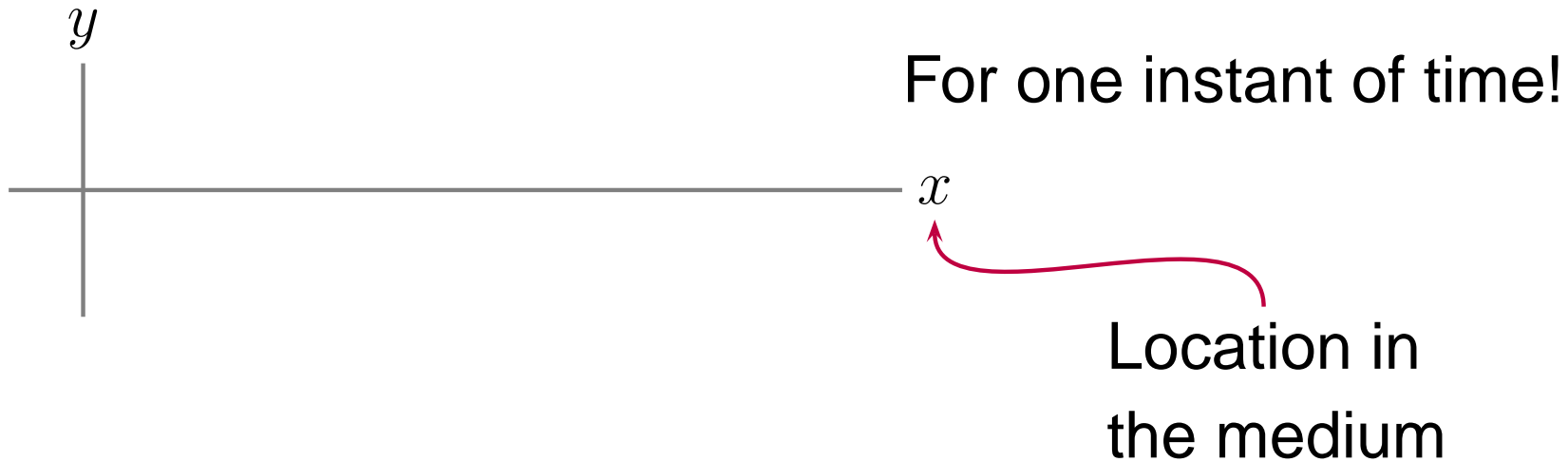
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For one instant of time!

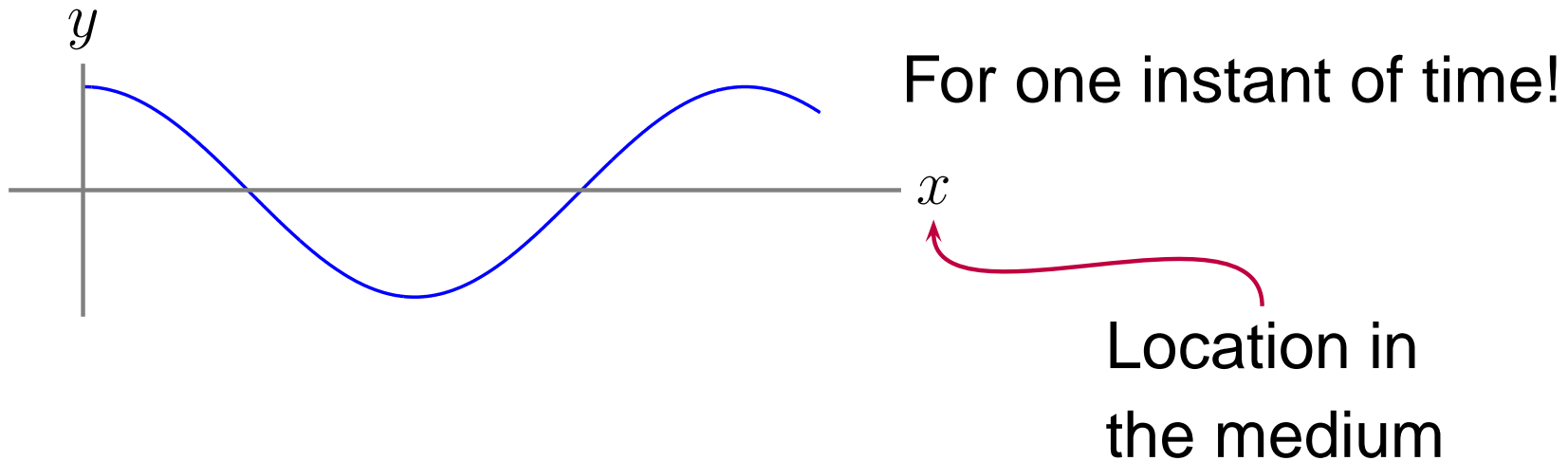
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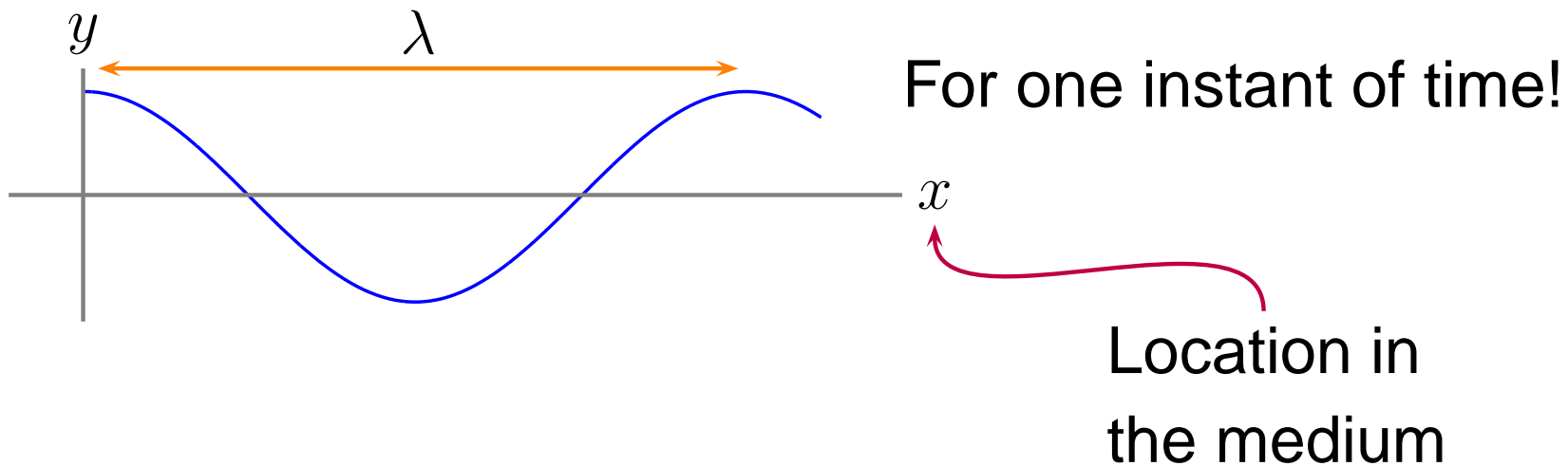
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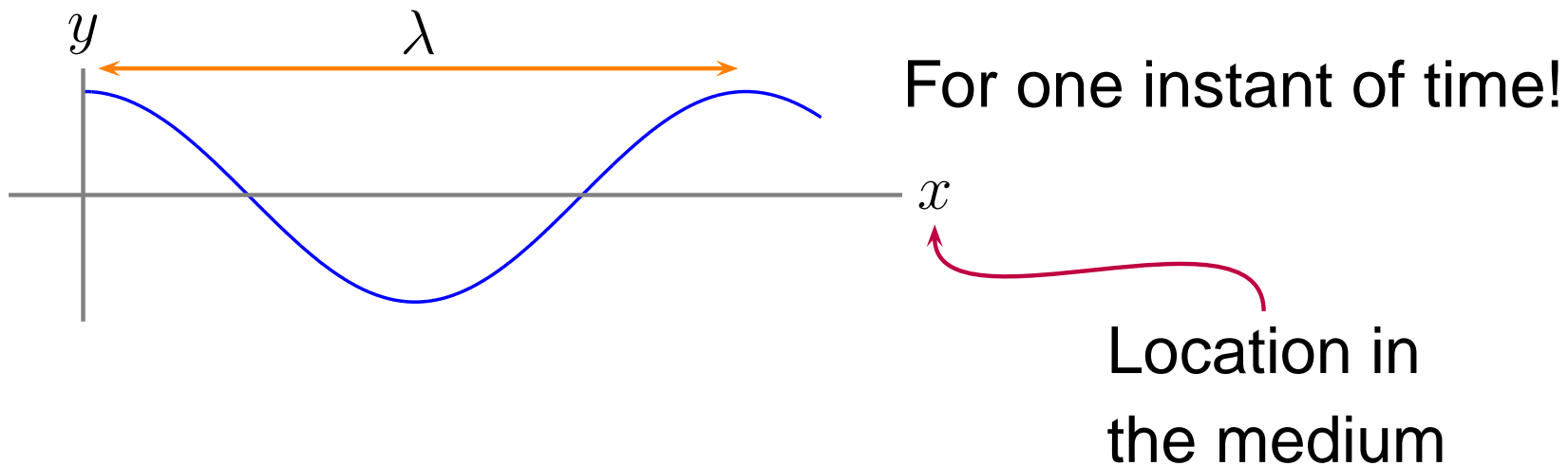
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Wavelength: λ Units: m

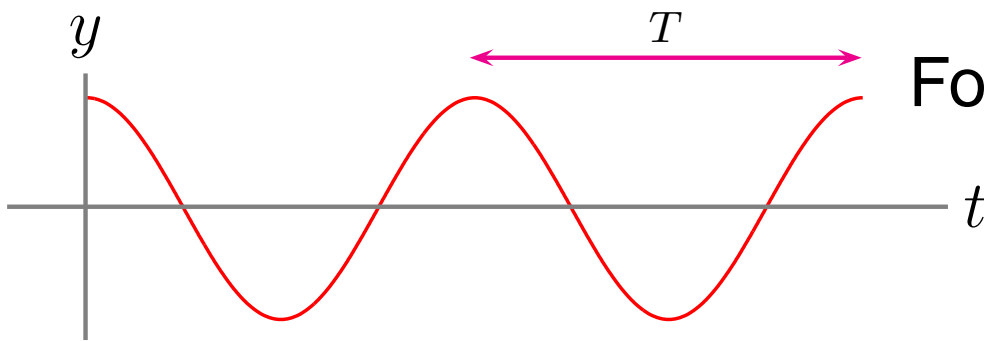
- Distance between points in the medium that are in phase

Wave Speed

Wave Speed, v : The rate at which the energy propagates.

Wave Speed

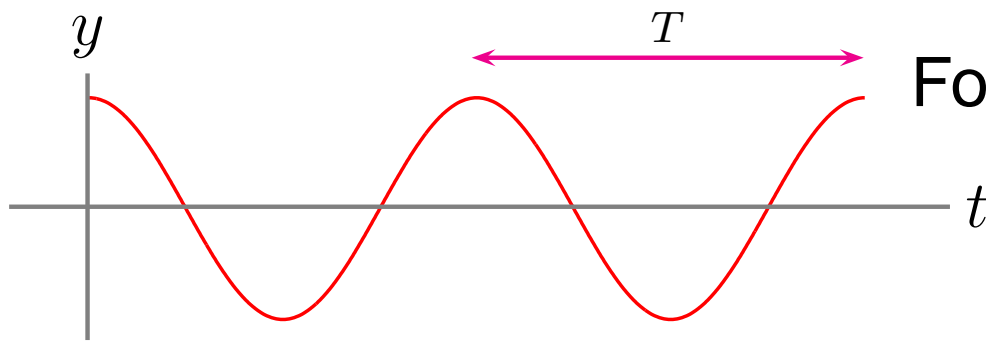
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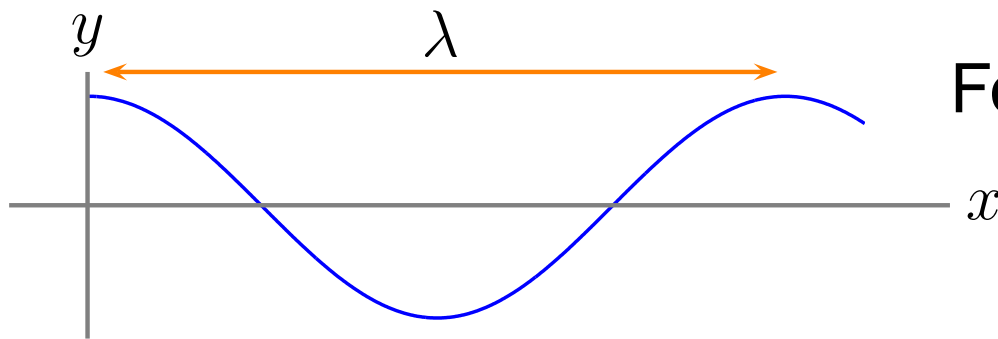
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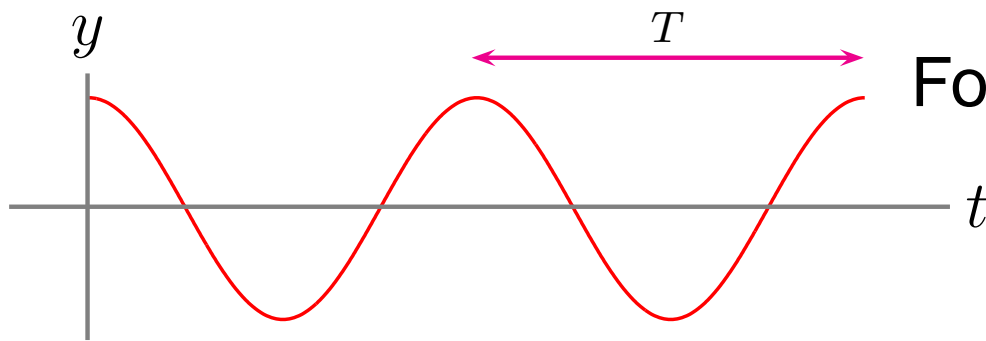
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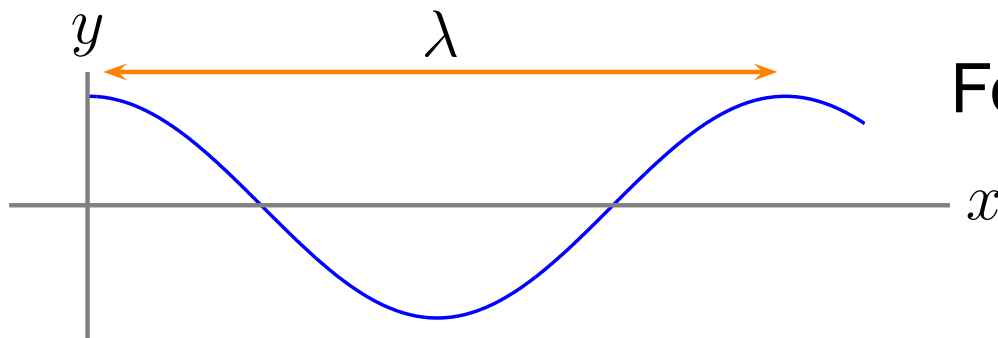
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$$v = \frac{\lambda}{T} = \lambda f$$