

A Motivating Example

- drawing the golden rectangle
- 2 Animating Two Dimensional Plots
  - increasing the frequency of a periodic function
  - a moving tangent line to the unit circle
  - Animating Three Dimensional Plots
    - spinning a surface
    - a space curve knot

#### MCS 320 Lecture 28 Introduction to Symbolic Computation Jan Verschelde, 12 July 2024

## A Motivating Example drawing the golden rectangle

Animating Two Dimensional Plots

increasing the frequency of a periodic function

a moving tangent line to the unit circle

Animating Three Dimensional Plots
spinning a surface

a space curve knot

#### The Golden Rectangle

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#### Animating Two Dimensional Plots

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# Animating Three Dimensional Plots spinning a surface

a space curve knot

#### Increasing the Frequency of a Periodic Function

Consider  $y = \exp(-x^2)\sin(2\pi x)$ .

- Introduce a parameter k for the frequency in  $\exp(-x^2)\sin(2k\pi x)$ .
- The first five frames are plots for k = 1, 2, 3, 4, 5.

#### Animating the Frequency

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#### Animating the Tangent Line to the Unit Circle

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### The Components in the Animation

Three components in this animation:

- The unit circle remains static.
- 2 The moving point is shown as a red disk.
- The moving tangent is the green line.

While each frame is computed separately, they all share

- the same static unit circle, and
- Ithe same layout for the point and line.

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Spin  $x^2 - y = 0$  by Rotating the *x*-Axis

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Spin  $x^2 - y = 0$  by Rotating the *y*-Axis

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Spin  $x^2 - y = 0$  by Rotating the *z*-Axis

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#### A Space Curve Knot

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