Lesson 17 - Parametric Equations

Objectives

- Understand what a parametric equation represents.
- Convert cartesian equations to parametric equations.
- Convert parametric equations to cartesian equations.
- Represent parametric functions in vector form.

READ

- Stewart, Chapter 10.1, pages 621-626.

THINK ABOUT

- How would you use a parametric equation to model a tank moving down a road?
- What additional information do parametric equation provide over a cartesian equation?
- How many parameterizations are there for any given curve?

MATHEMATICA COMMANDS AND TASKS YOU NEED TO KNOW

In order to plot a parametric curve in two dimensions the following command is used:

```
ParametricPlot[{x[t],y[t]}, {t,a,b},AxesLabel→{"x axis name","y axis name"}]
```

Where a is your start time and b is your stop time. $x[t]$ and $y[t]$ are the x and y parametric equations. In order to plot a parametric curve in three dimensions you add the $z[t]$ parametric equation into the command like this:

```
ParametricPlot3D[{x[t],y[t],z[t]}, {t,a,b},AxesLabel→{"x axis name","y axis name","z axis
name"}]
```

Note: Many times the additional plot option `BoxRatios->{1,1,1}` helps create an image that is more informative.