CHAPTER 1

Installation

In Julia, you can install the `VehicleModels.jl` package by typing:

```
Pkg.clone("https://github.com/huckl3b3rry87/VehicleModels.jl")
```
The first example demonstrates moving obstacle avoidance for a large-sized high-speed ground vehicle.

**Using DifferentialEquations.jl to solve a set of ODEs**

In this example we use two small packages along with DifferentialEquations.jl that can be downloaded by typing:

```julia
Pkg.clone("https://github.com/huckl3b3rry87/VehicleModels.jl")
Pkg.clone("https://github.com/huckl3b3rry87/PrettyPlots.jl")
```

Then, the example can be ran by going into the examples folder and typing:

```julia
include("test.jl")
```

This is a mock example, but it demonstrates the utility of DifferentialEquations.jl. What we are doing is passing the control signals (optimized steering rate and longitudinal jerk) for a large-sized ground vehicle to a set of differential equations that describe the vehicle dynamics.

From the optimized data, we also have all of the states so we compare the results of the two models in this case. The two models should be very close, which they are for the most part, except where the optimized steering rate and longitudinal jerk are very jumpy.

For a closer look at the end (last optimization) of the static plots, look below.

**Taking a look at the states:**
A closer look at the states and controls:
2.1. Using DifferentialEquations.jl to solve a set of ODEs
2.1. Using `DifferentialEquations.jl` to solve a set of ODEs
Chapter 2. Examples
2.1. Using DifferentialEquations.jl to solve a set of ODEs
2.1. Using `DifferentialEquations.jl` to solve a set of ODEs
The tire forces are:
2.1. Using DifferentialEquations.jl to solve a set of ODEs
The examples for this package are available by typing:

```julia
using IJulia
notebook(dir = Pkg.dir("VehicleModels")*"/examples")
```

Then, the Three_DOF_ex.ipynb can be looked at!
If you find this package useful, please cite this paper (currently in review):

```latex
@article{Febbo2016,
  title = {Moving Obstacle Avoidance for Large, High-Speed Autonomous Ground Vehicles},
  author = {Huckleberry Febbo, Jiechao Liu, Paramsothy Jayakumar, Jeffrey L. Stein, and Tulga Ersal},
  conference = {Dynamic Systems and Control Conference},
  year = {2016},
} 
```