Convex.jl Tutorial

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The Julia programming language

- a new programming language for scientific computing
  - developed by a group mostly from MIT
  - fully open source, *i.e.*, free
  - convenient syntax for building math constructs like vectors, matrices, etc.
  - super fast

Installing Julia

- download Julia v0.3 from `http://julialang.org/downloads/`
- follow the on-screen instructions to install

Resources for learning Julia

- Julia official documentation:
  `http://docs.julialang.org/en/release-0.3/`
- Basic Julia tutorials:
  `http://learnxinyminutes.com/docs/julia/`
- Setting up the IJulia environment:
  `https://github.com/stevengj/julia-mit`

Disciplined Convex Programming

- DCP is a system for constructing mathematical expressions with definitive curvature
- covers a wide variety of convex optimization problems (but not all of them!)
- allows software to easily detect if an optimization problem is convex
- more on DCP here: `http://dcp.stanford.edu`

Convex.jl

- Julia package for Disciplined Convex Programming
  - serves as an interface between convex optimization problems on paper and backend solvers
  - allows many convex optimization problems to be described in natural, mathematical syntax

Installing Convex.jl

1. open a Julia terminal
2. update to the most recent listing of packages

   ```
   Pkg.update()
   ```
3. install SCS, the default backend solver for Convex.jl

   ```
   Pkg.add("SCS")
   ```
4. install Convex.jl

   ```
   Pkg.add("Convex")
   ```

Basic Convex.jl program

- try it out just to make sure everything installed correctly

```
using Convex

x = Variable()
p = minimize(x, x >= 0)
solve!(p)
```

Convex.jl full documentation

- full documentation of how to construct and solve convex optimization problems in Convex.jl can be found at `http://convexjl.readthedocs.org`