HASKELL SPACEFLIGHT WORKSHOP

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The workshop is on GitHub, but has many dependencies:

- https://www.github.com/lancelet/space-workshop
- `stack` will fetch and build dependencies (slowly)
- Docker image available on USB flash drives

Main objectives:

- Solve spaceflight problems
- Promote numerical programming to FP people
- Get feedback on ideas and approaches

General approach:

- "Traditional" ODE solving, but with Haskell
- Initial value problems
- Engineering focus:
  - Development and interpretation of ODEs
  - Rich states, with typed vector components
  - Units (example only)
  - ODEs include control signals

Outline:

- Introduction to numerical integration of ODEs
  - Euler's method
  - 4th-Order Runge Kutta
  - Apollo lunar ascent guidance example
- Tsiolkovsky Rocket Equation
  - Propellant mass fraction / mass budget
  - Specific impulse
  - Staging example
  - Tsiolkovsky Rocket Equation
- Hohmann transfers
  - Kepler's Problem and Keplerian Motion
  - Instantaneous impulse approximation
  - Finite impulse numerical simulations
- Suggestions for further projects