

Astrodynamics.jl

**AN OPEN-SOURCE FRAMEWORK FOR
INTERACTIVE HIGH-PERFORMANCE
MISSION ANALYSIS**

HELGE EICHHORN – OSCW 23/11/2017



<https://github.com/helgee/oscw-2017>

What implicit assumptions
are holding us back?

Reusable



Affordable



Orbital

Reusable



New Shepard



Affordable



Orbital

Reusable



Space Shuttle



Orbital



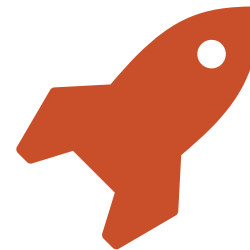
Affordable

Reusable



Affordable

Vega

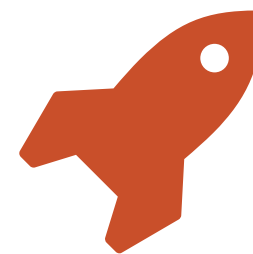


Orbital

Reusable



Affordable



Orbital

LOL, NOPE.

Interactive



**High
Performance**



**Easily
Extensible**

Interactive



High
Performance

C++
Fortran
Java



Easily
Extensible

Interactive



**MATLAB
Python**



**Easily
Extensible**

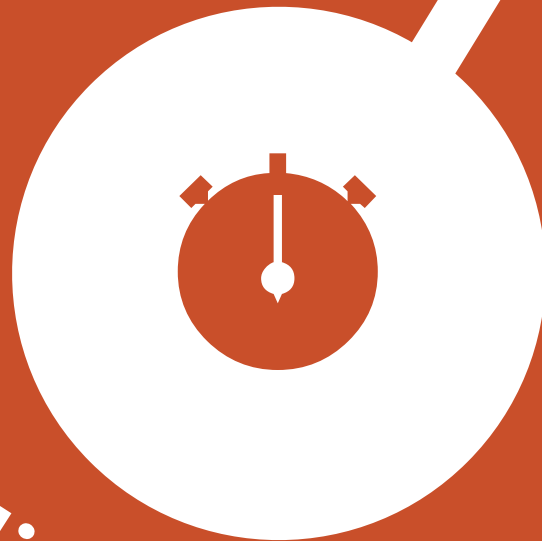


**High
Performance**

Interactive



MEX
GMAT
STK



High
Performance



Easily
Extensible

Interactive



?



**High
Performance**



**Easily
Extensible**

ICATT STUDY

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1. Calculating the Keplerian orbital elements

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1. Calculating the Keplerian orbital elements
2. Solving Kepler's equation

ICATT STUDY

1. Calculating the Keplerian orbital elements
2. Solving Kepler's equation
3. Solving Lambert's problem

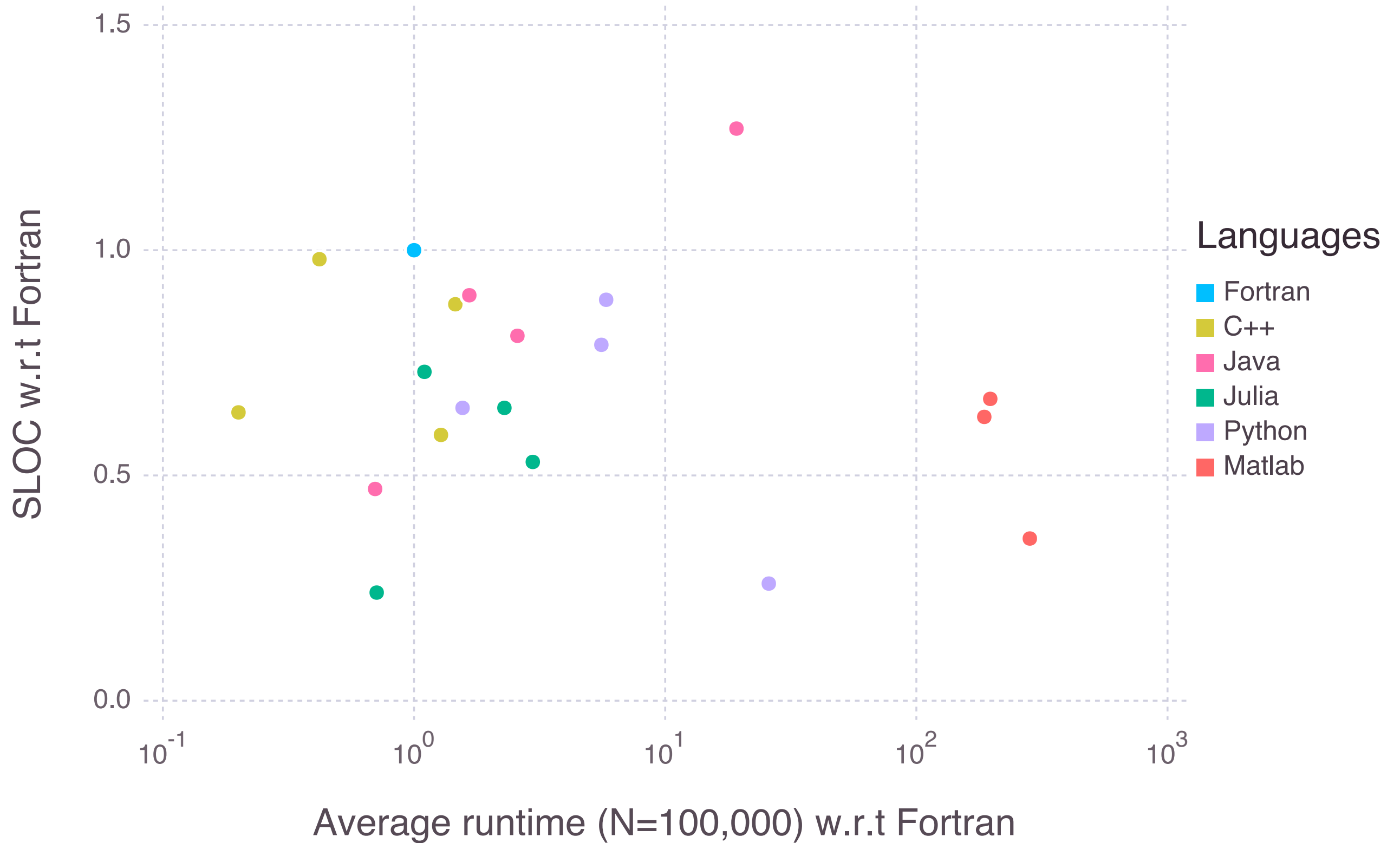
ICATT STUDY

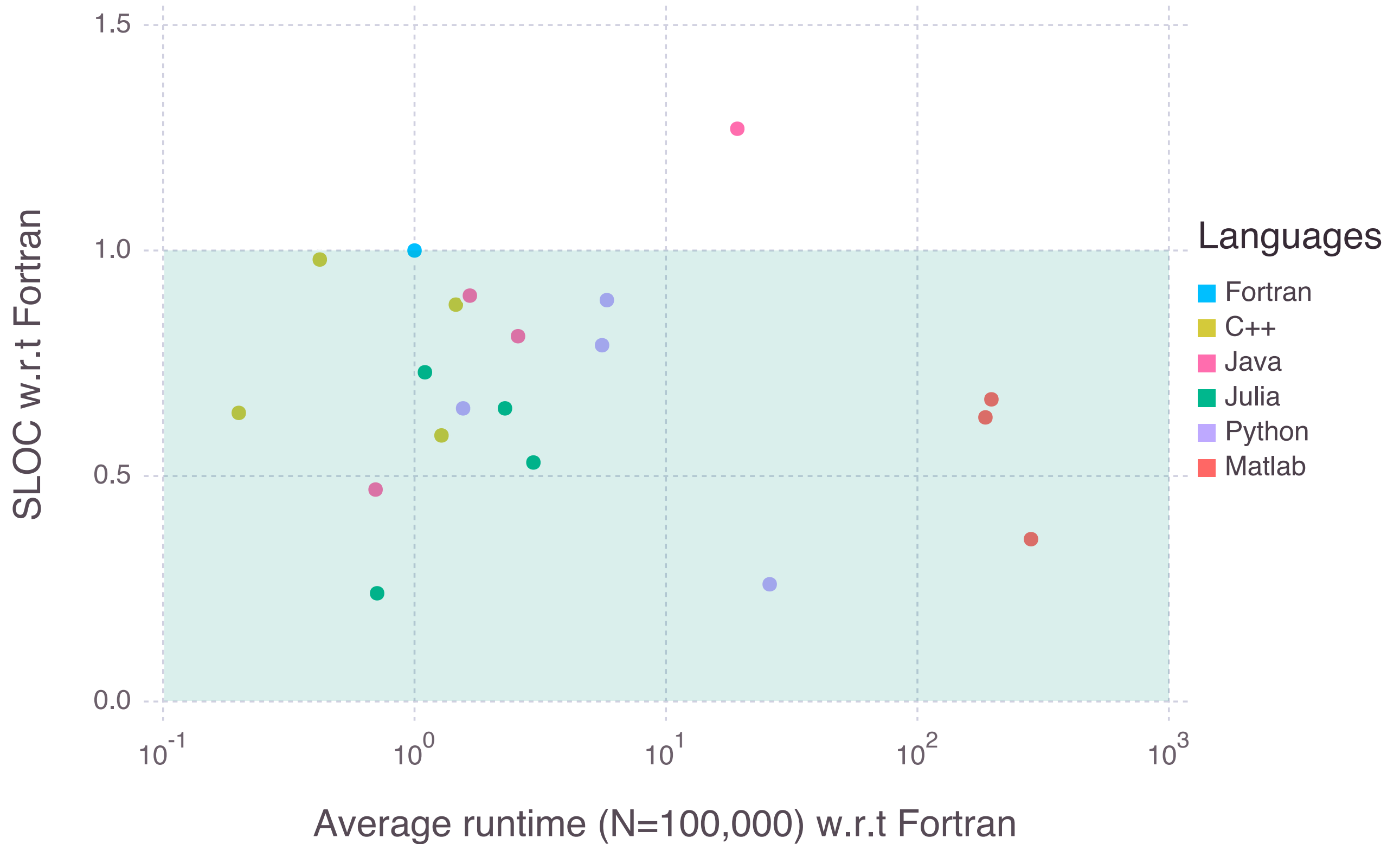
1. Calculating the Keplerian orbital elements
2. Solving Kepler's equation
3. Solving Lambert's problem
4. Calling the DOP853 Fortran 77 code

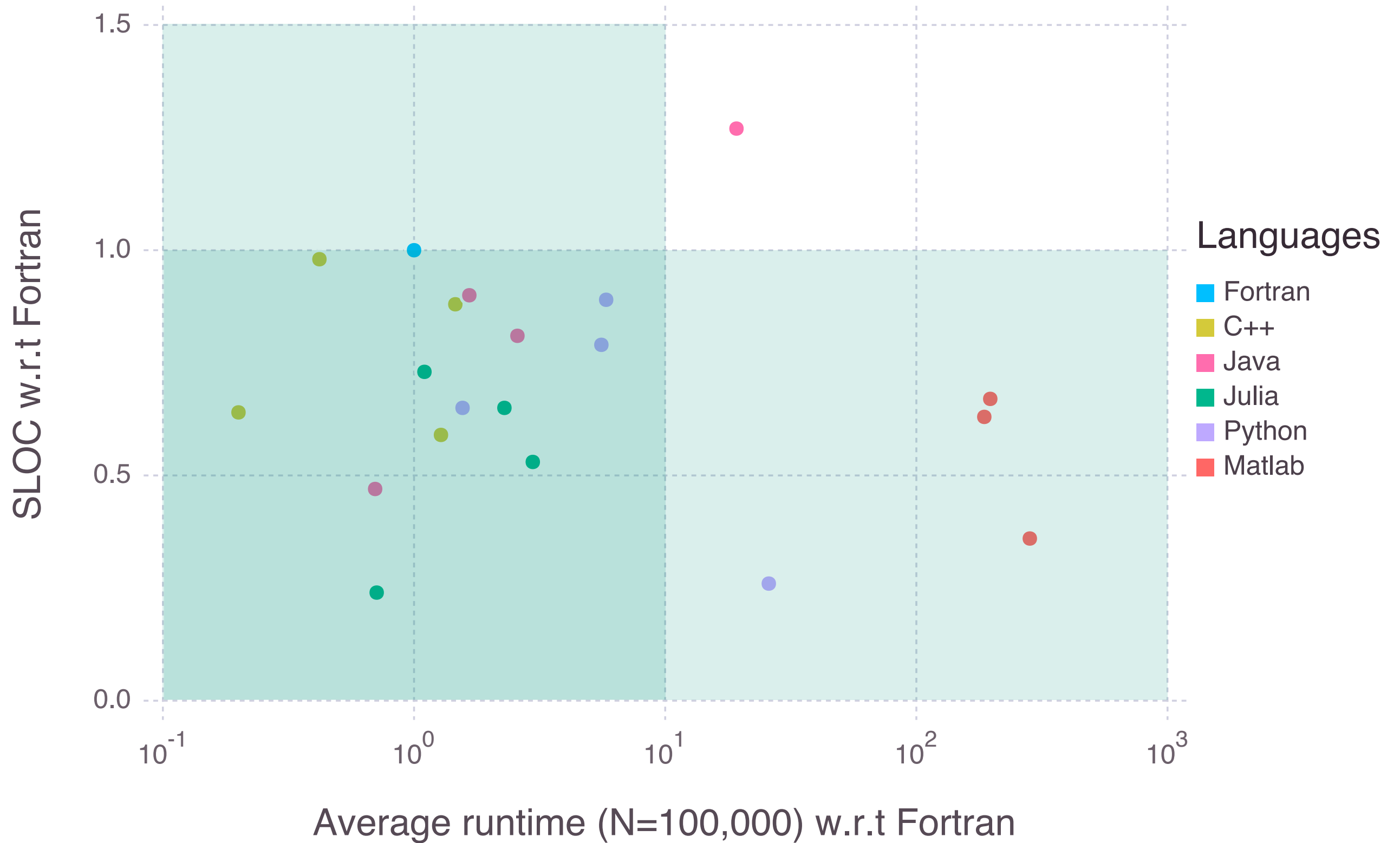
ICATT STUDY

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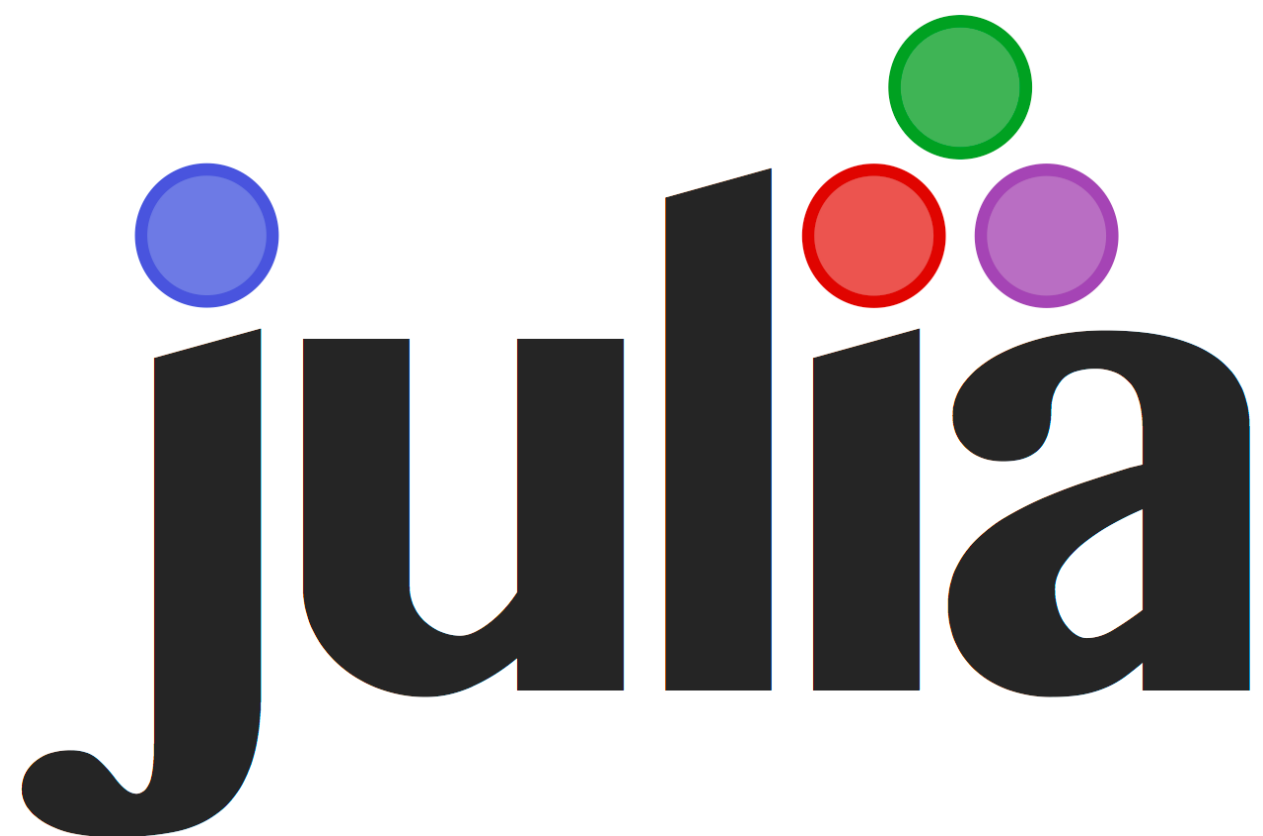
Fortran, C++, Java, MATLAB, Python, **Julia**







How I Learned to Stop Worrying and Love the JIT

The logo for the Julia programming language, featuring the word "julia" in a dark gray, lowercase, sans-serif font. Above the letters are four colored circles: a blue circle above the 'j', a red circle above the 'i', a green circle above the 'l', and a purple circle above the 'a'.

julia



AstroDynamics.jl

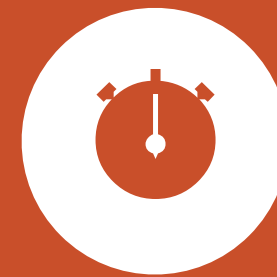
<https://github.com/JuliaAstrodynamics/AstroDynamics.jl>

Example

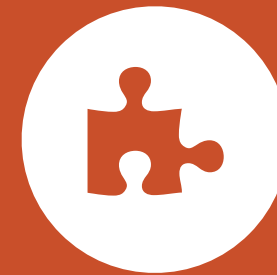
High performance



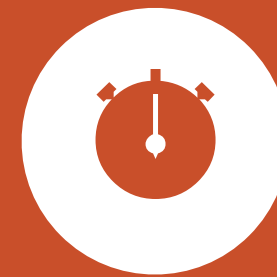
High performance



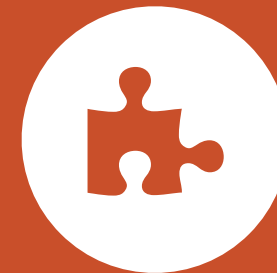
Extensible at runtime



High performance



Extensible at runtime



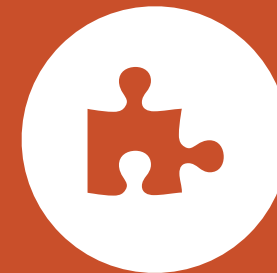
API for humans



High performance



Extensible at runtime



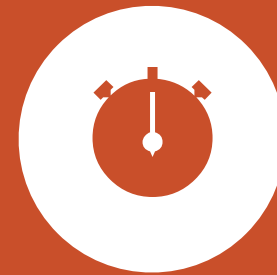
API for humans



Well documented



High performance



Extensible at runtime



API for humans



Well documented



Make STK obsolete



High performance



Extensible at runtime



API for humans



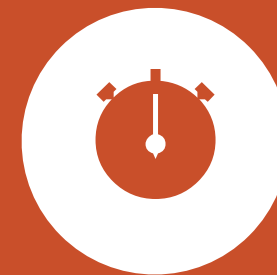
Well documented



Make STK obsolete



High performance



Extensible at runtime



API for humans



Well documented



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High performance



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API for humans



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High performance



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High performance



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API for humans



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Make STK obsolete



A curved horizon of Mars, showing its reddish-brown surface with numerous craters and a thin white atmospheric glow, set against a black background.

How I can I help you get
your mission off the
ground?

A curved horizon of Mars, showing its reddish-brown surface with numerous craters and a thin white atmospheric glow, set against a black background.

How I can I help you get
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ground?

THANK YOU VERY MUCH!