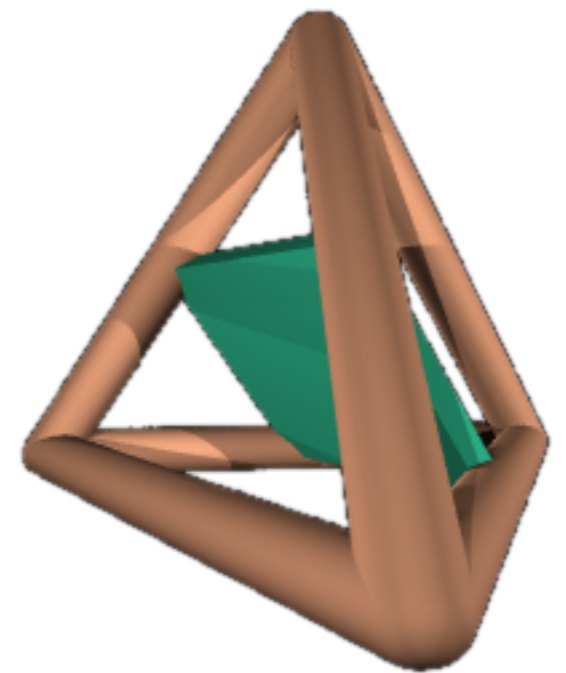


Regina: 3-manifolds and normal surfaces

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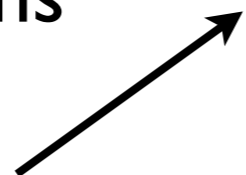


<http://regina.sourceforge.net/>

Motivation

- Framework to solve “hard” problems on 3-manifold triangulations

- Decision problems



Is this manifold trivial (S^3)?
Is this manifold prime?
Is this the unknot complement?



Is this sufficiently large (Haken)?
Are these same 3-manifolds?

- Decomposition problems



Connected sum decomposition



Geometric decomposition



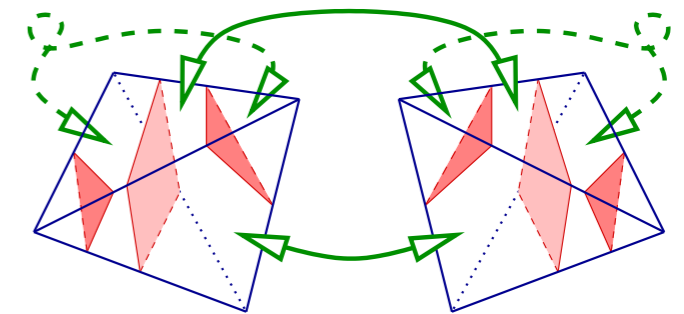
- Recognition problems



Which 3-manifold is this?

Capabilities

- Manipulate 3-manifold triangulations
- Normal surfaces
- High-level algorithms



*e.g.: 3-sphere/unknot recognition
prime decomposition*

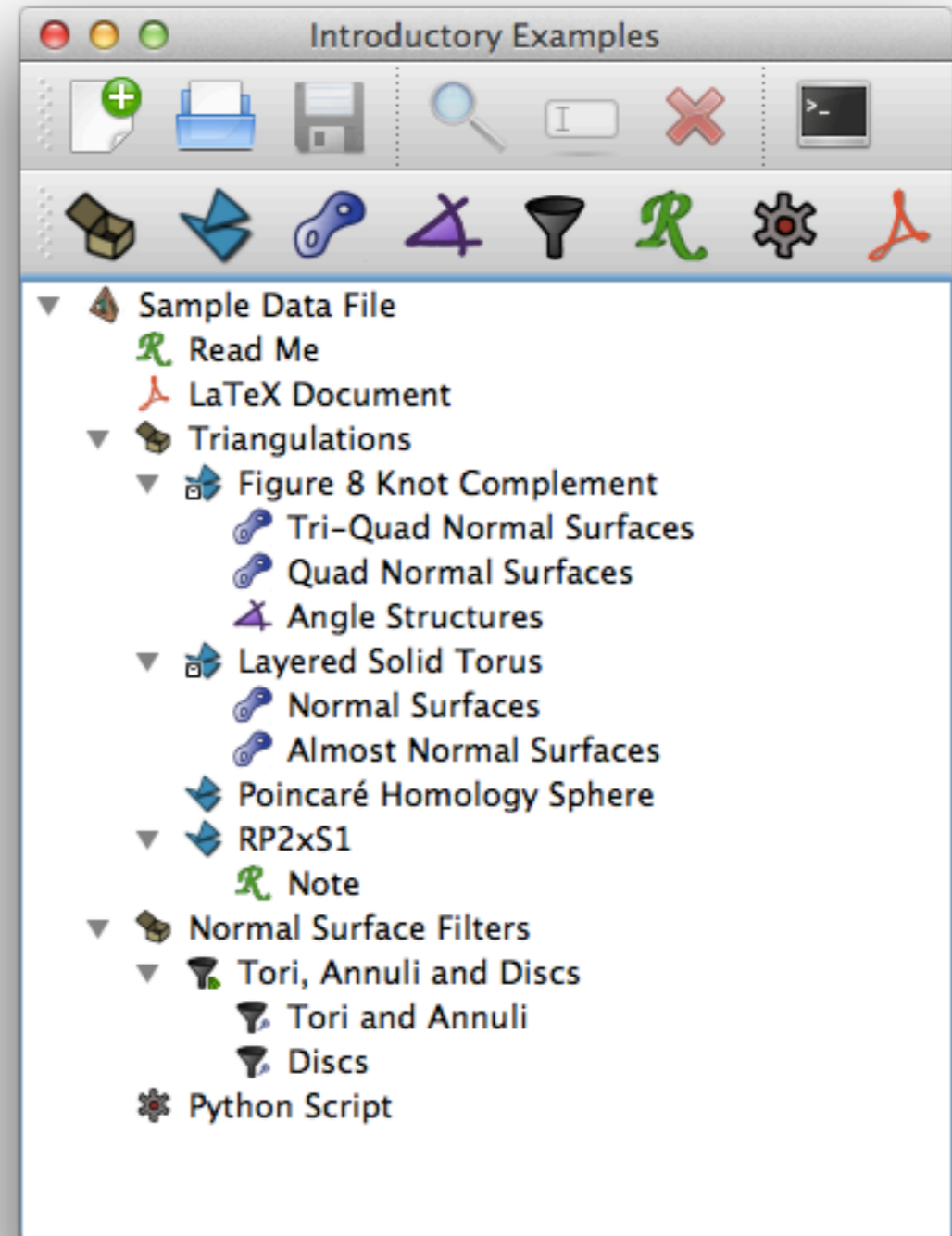
- Angle structures
- Census enumeration
- In the pipeline: 4-manifolds



Interfaces

- GUI for humans
- Python for scripting
- C++ for low-level coding

- Linux / Mac / Windows
- Rich documentation



History

- Started in late 1990s
- Philosophy: (1) correct, (2) general, (3) fast
- Open source (GPL), contributions welcome
- Now > 175,000 lines of C++ source code
- Used in “real” computer proofs
- Many people to thank (*Help* → *About*)