
Progeny
Final Presentation

Agenda

- What is Progeny?
- Procedural Generation
- Project Scope and Goals
- Technology
- Project Layout
- Parameterization
- Conclusion

What is Progeny?

- A library for procedural generation of 3D art assets for games
- Independent of any rendering system
- Focus on generation of realistic planets in real time
- Proposed by Source Studio

Procedural Generation

Advantages

- Very compact representation
- No fixed resolution
- Parameterize to create related objects

Disadvantages

- Difficult to build and debug
- Can be unpredictable
- Generation of assets can be slow

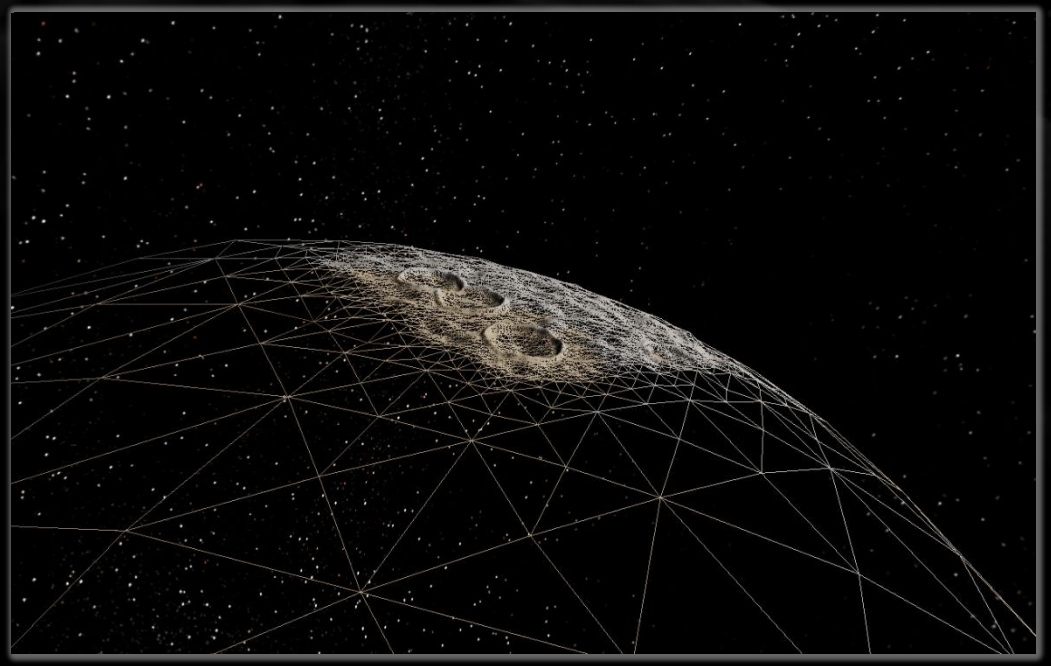
Scope and Goals

- Provide reusable library for creating scalable planets
- Sample application to show customizable Progeny-generated planets in interactive form
- Independent of any game or graphics rendering engine

Technology

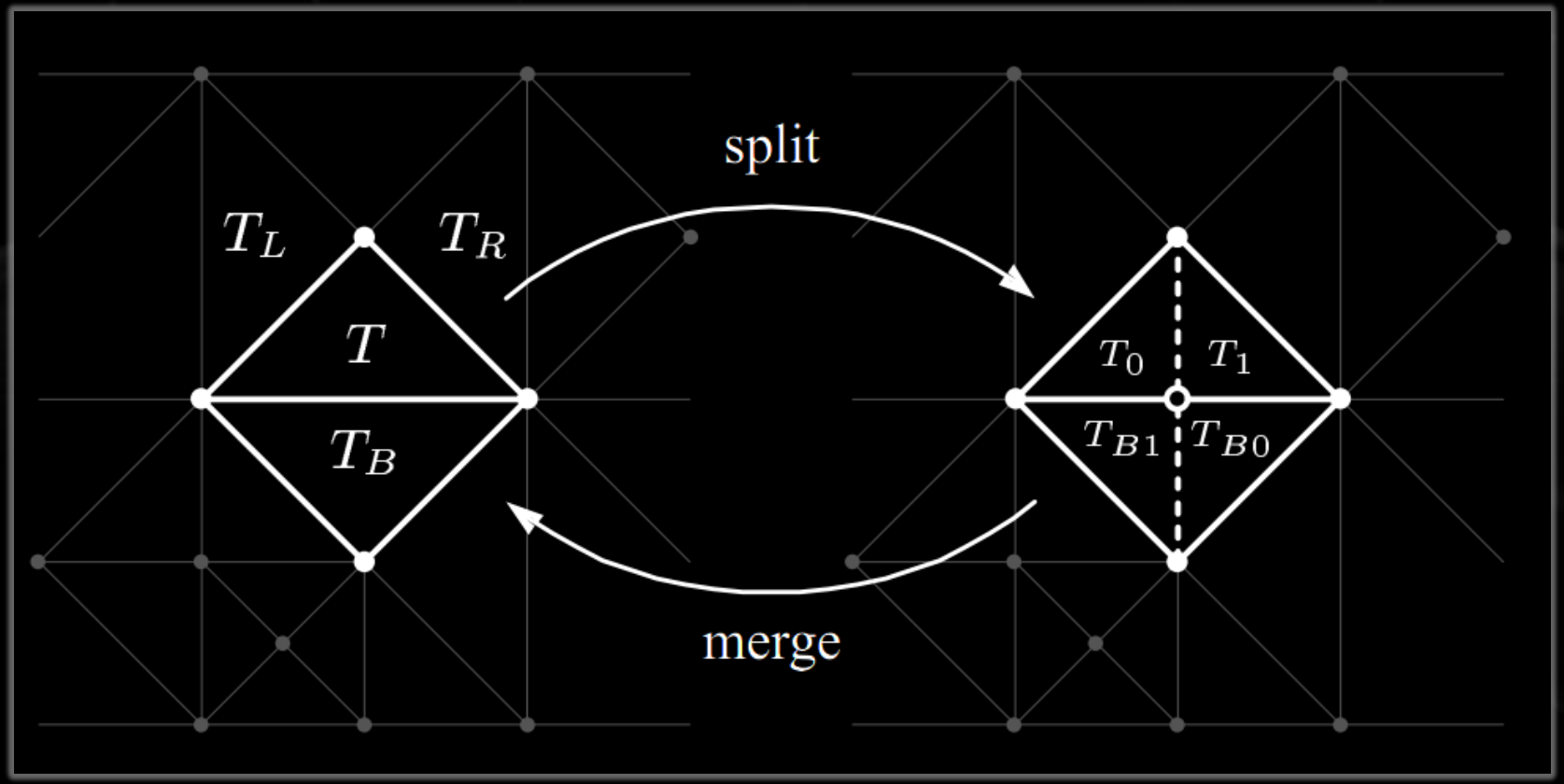
Real-time Optimally Adapting Meshes (ROAM)

- Maintains acceptable level of detail regardless of distance from planet
- Mesh changes based on camera position and orientation



Technology

ROAM (cont'd)

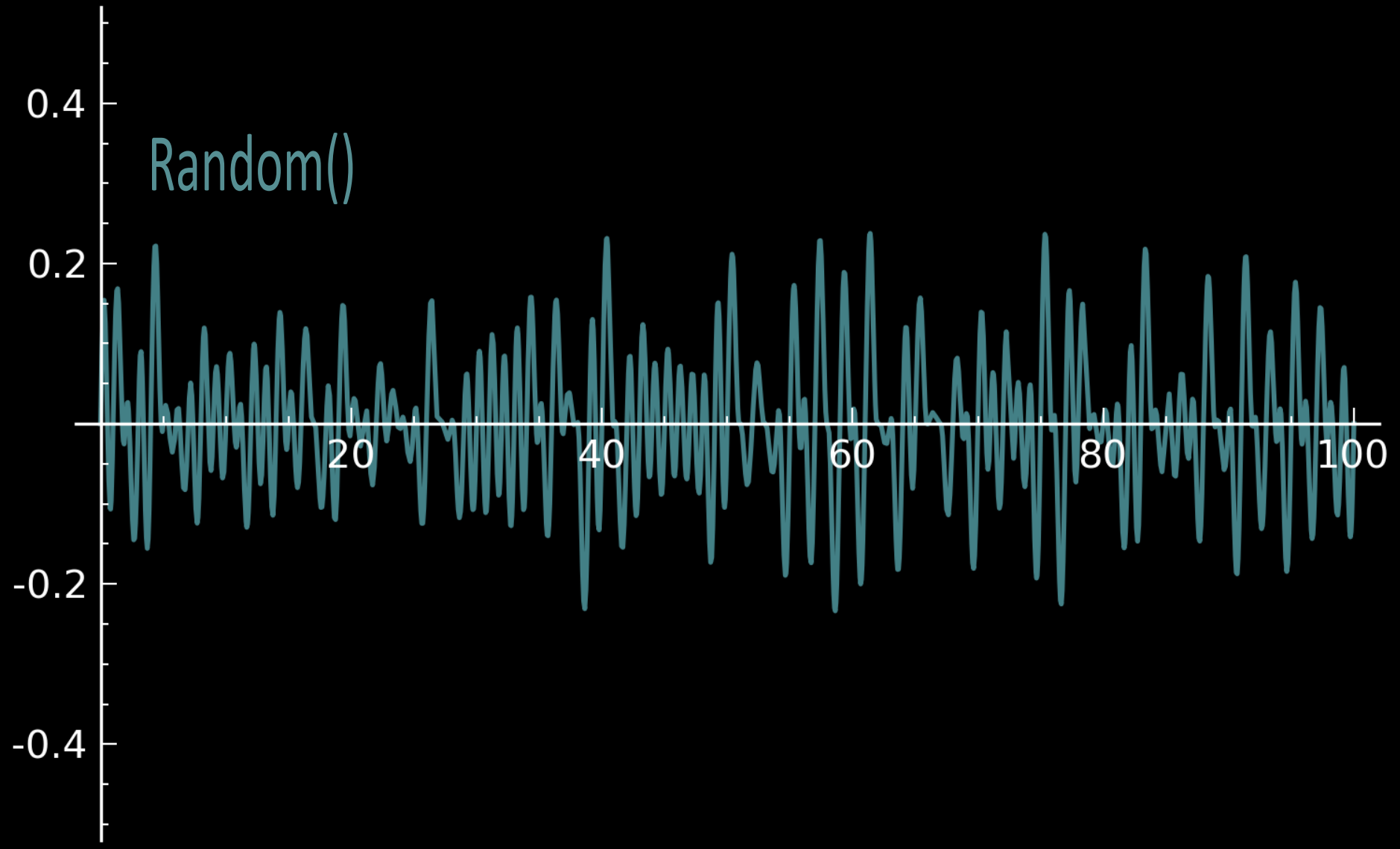


Technology

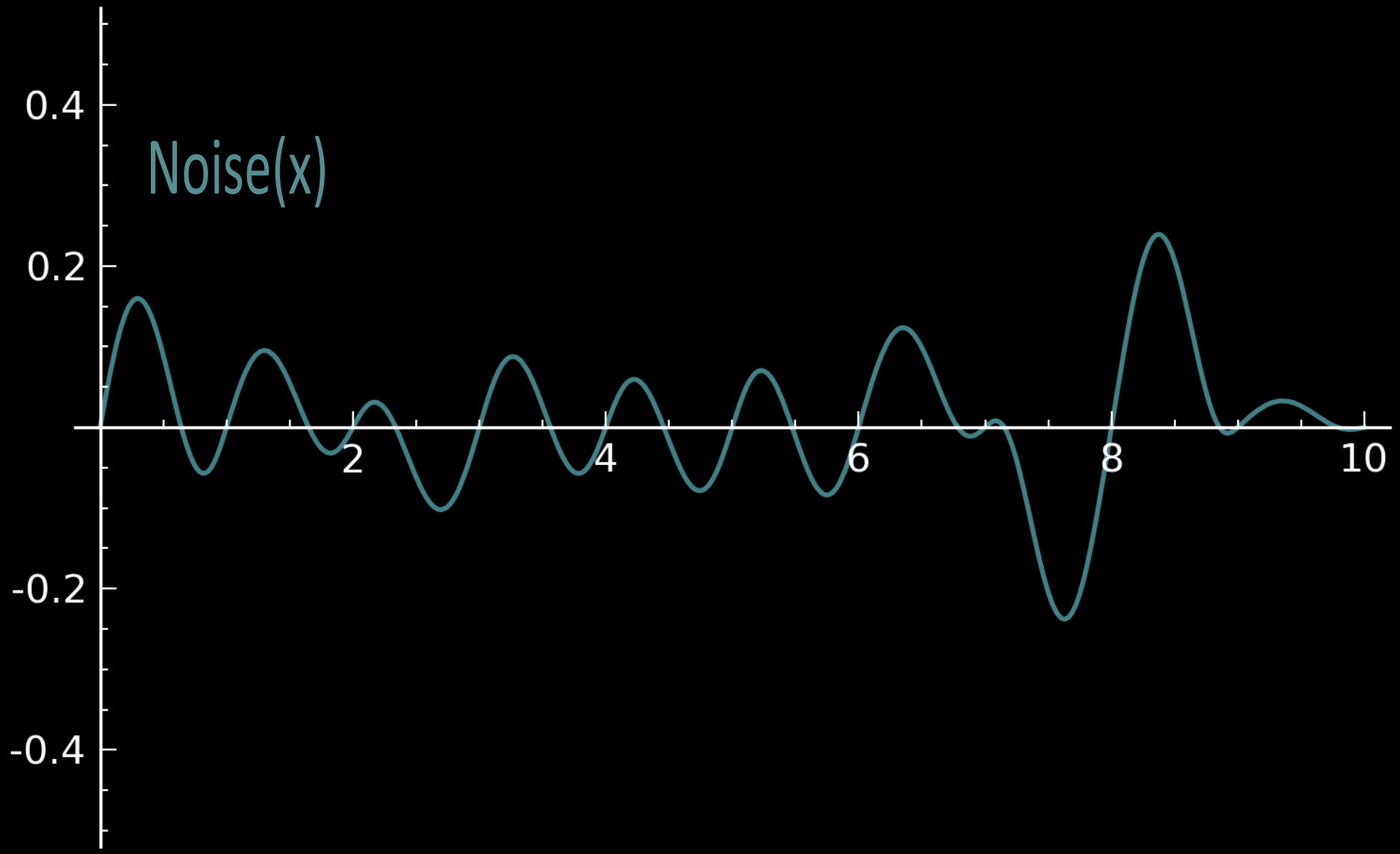
Coherent Noise

- Facilitates replication of naturally occurring objects and materials
- Solves the problem of creating convincing elevation height maps
- Using libnoise for noise generation

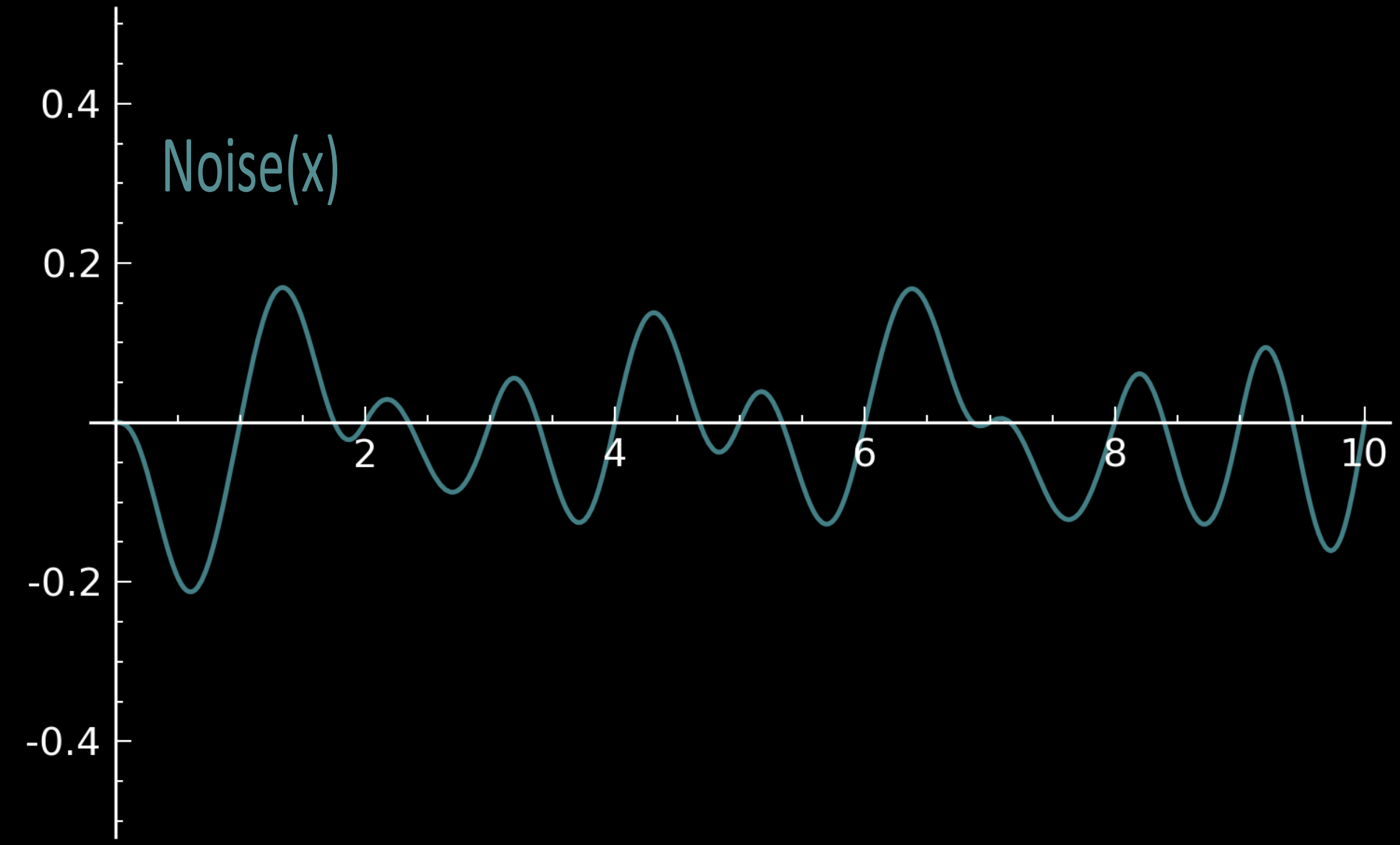
Incoherent Noise



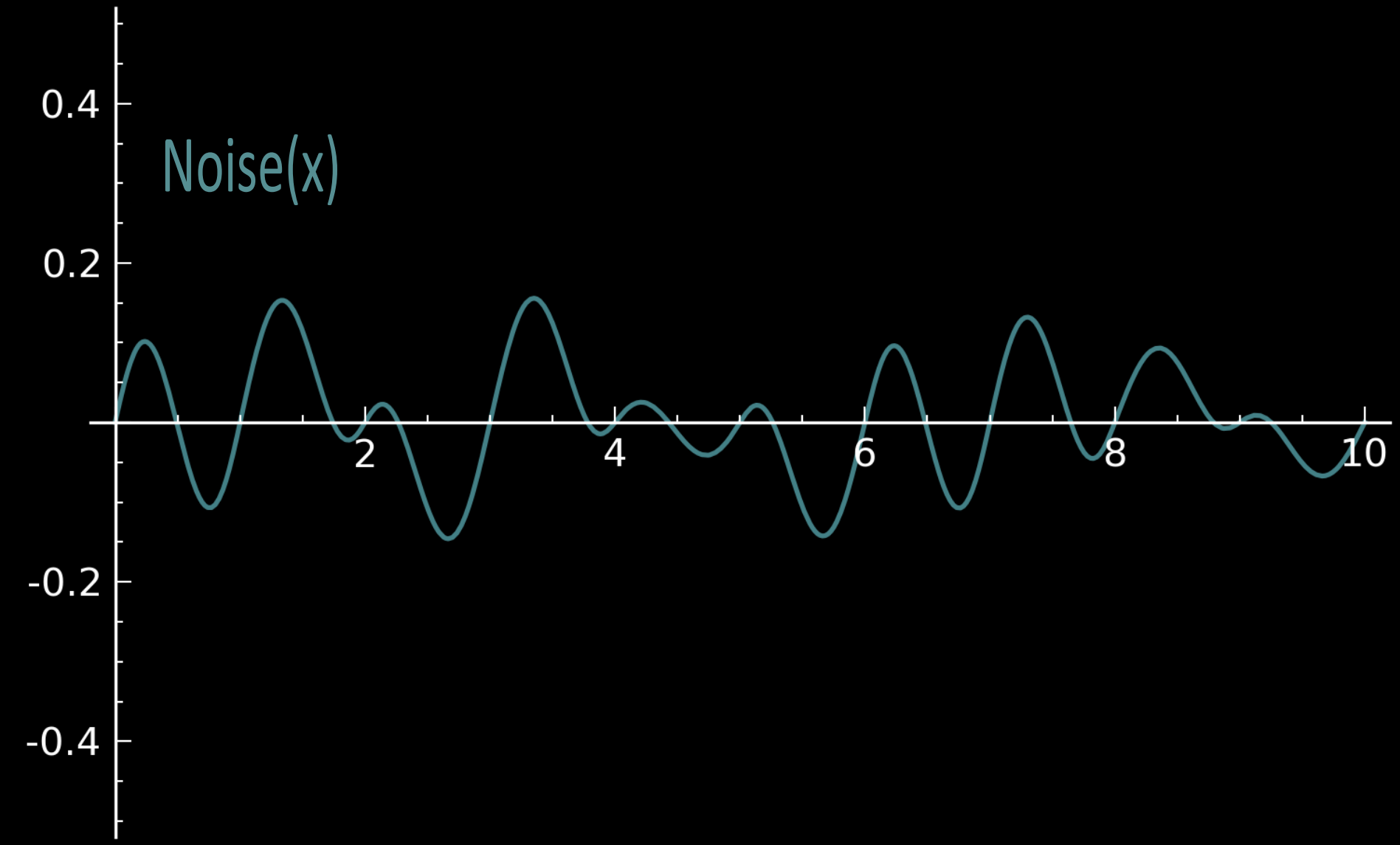
Coherent Noise Function



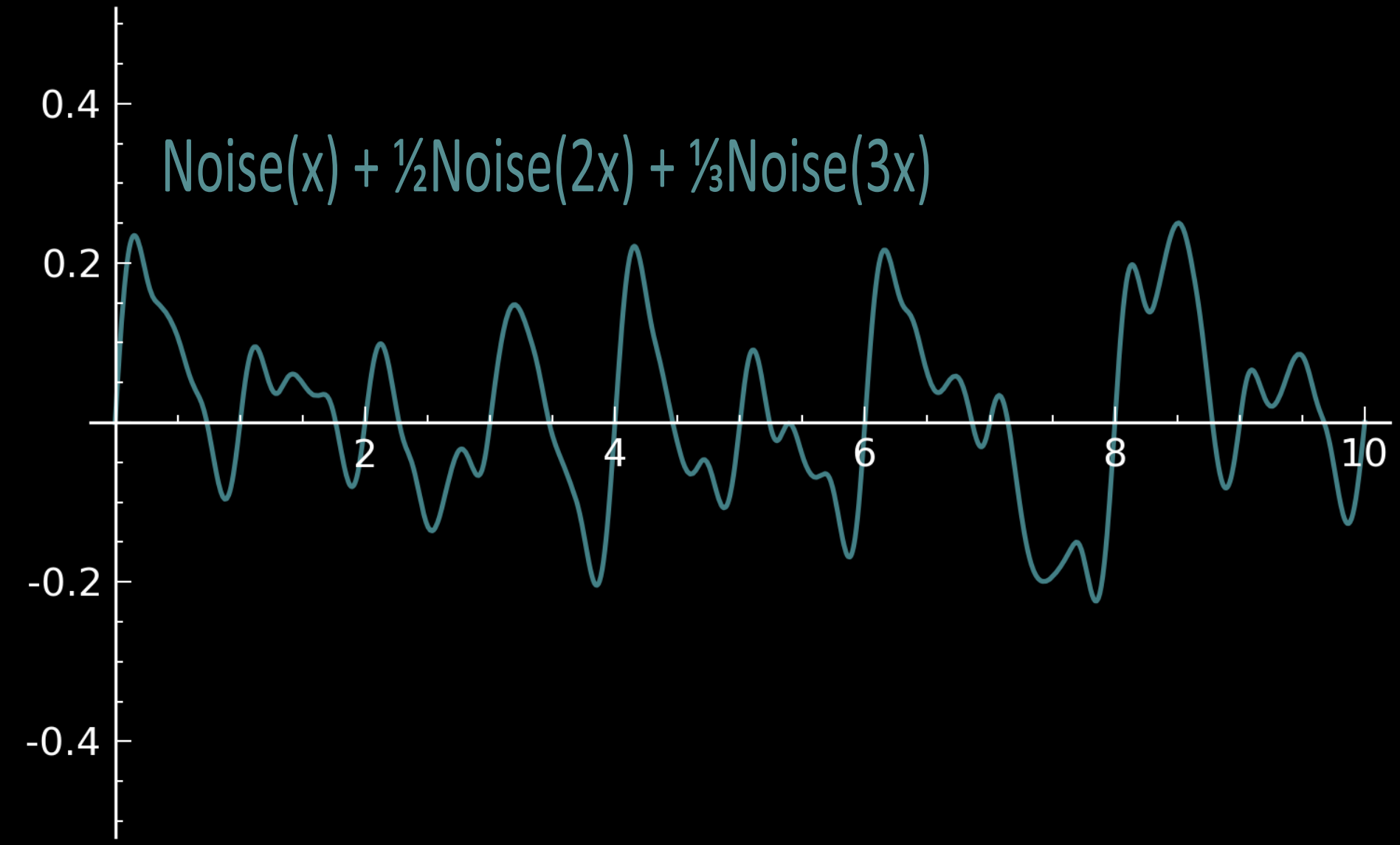
Alternate Seed



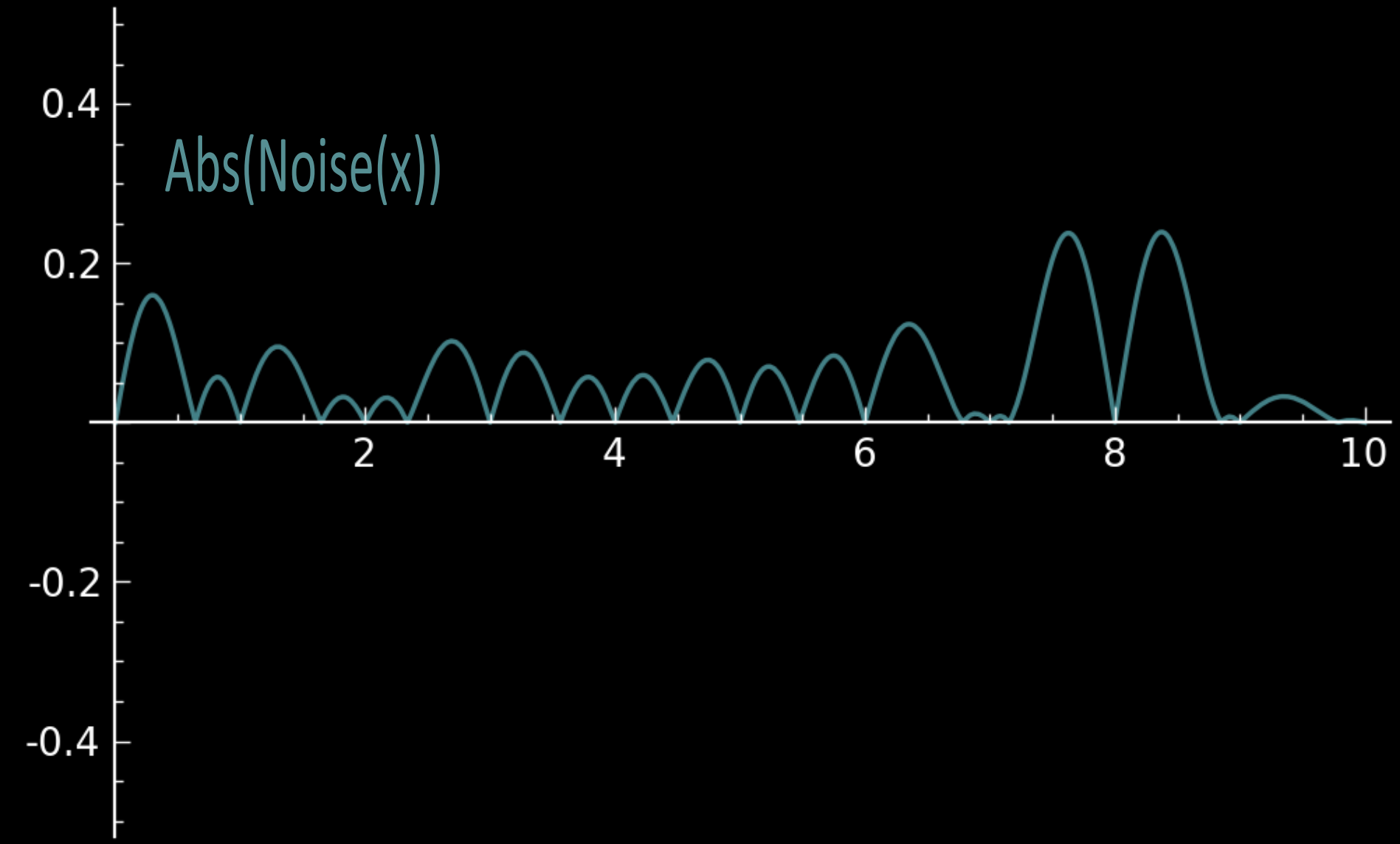
Another Seed



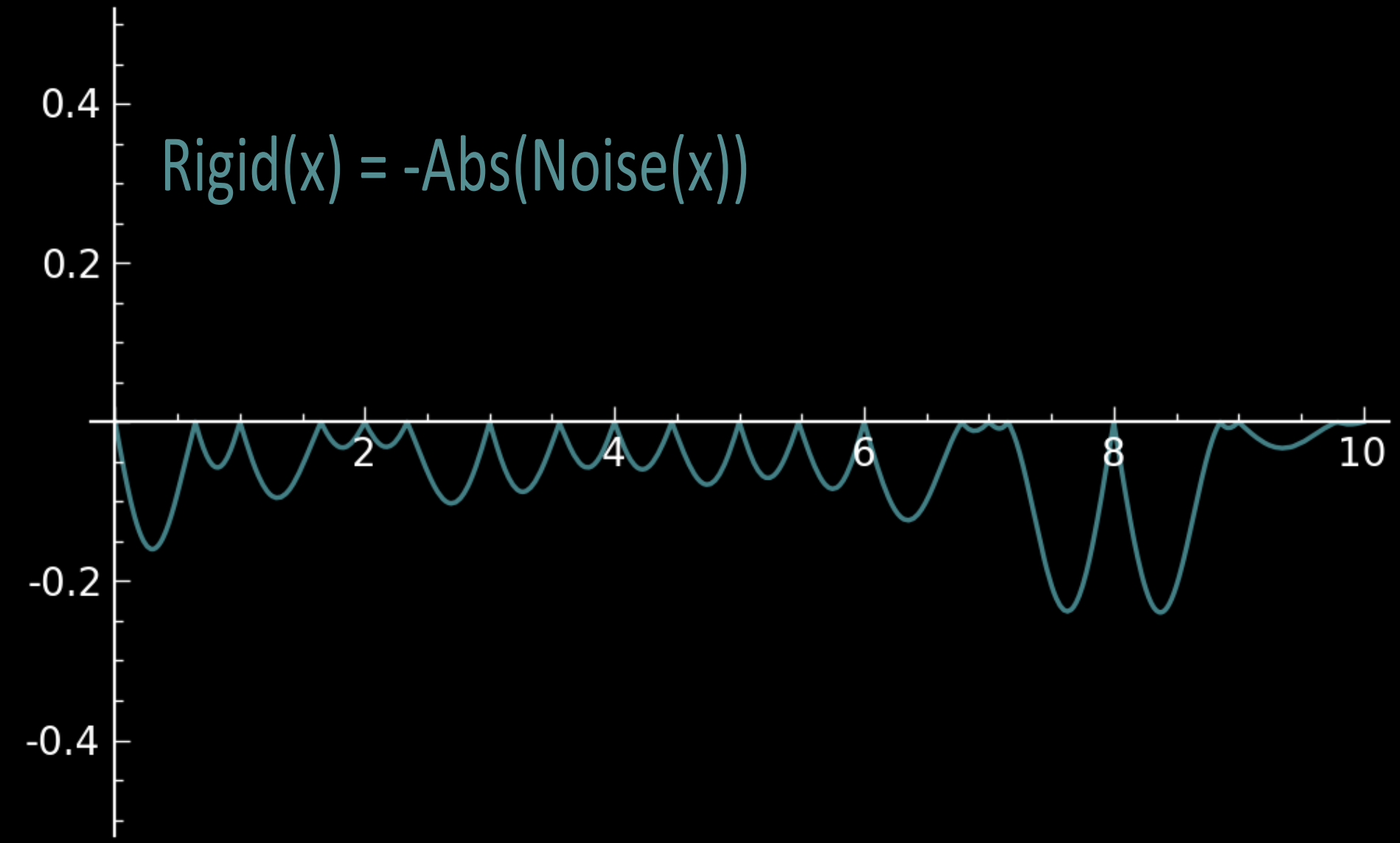
Adding Octaves



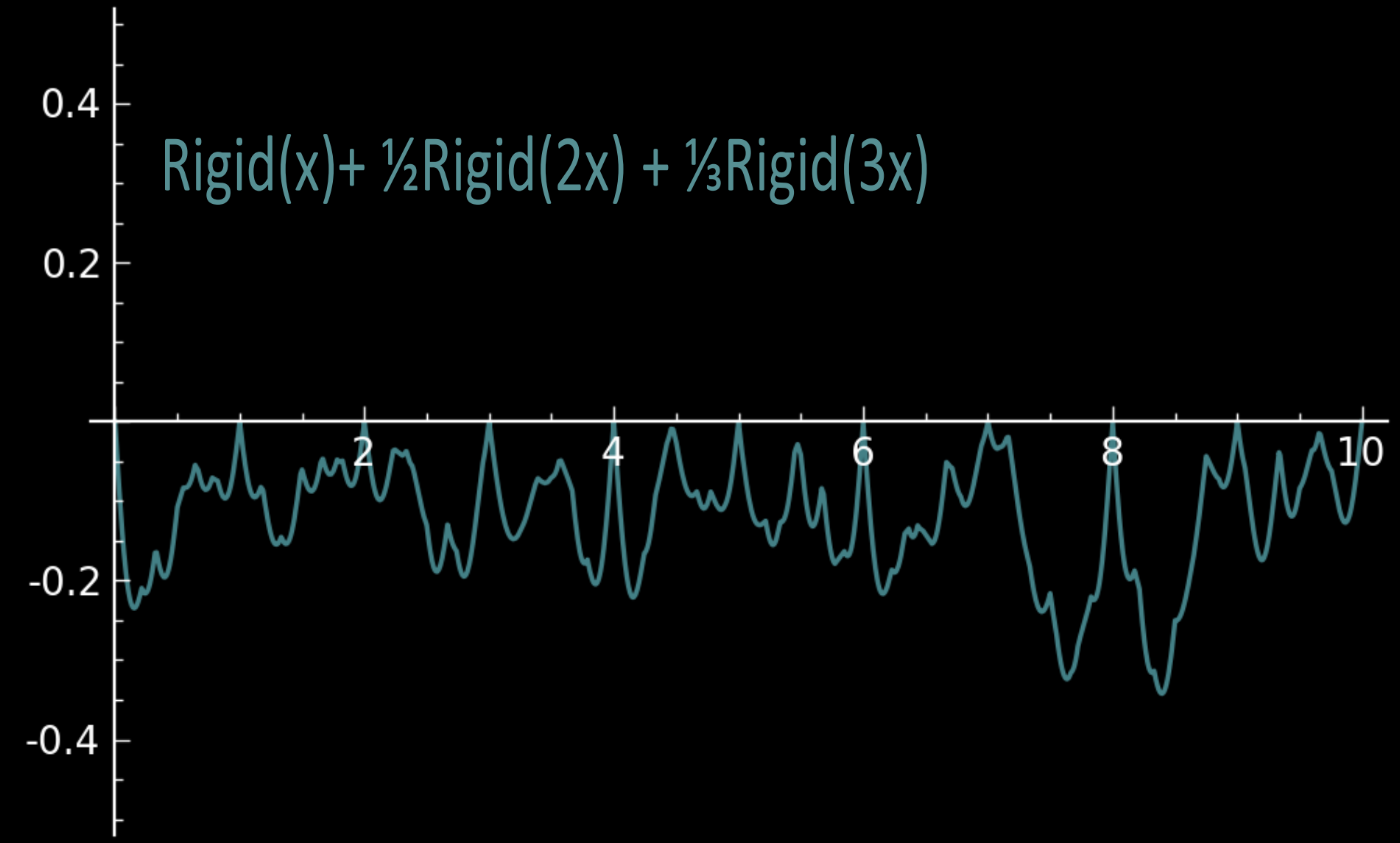
Billows



Rigid Multi

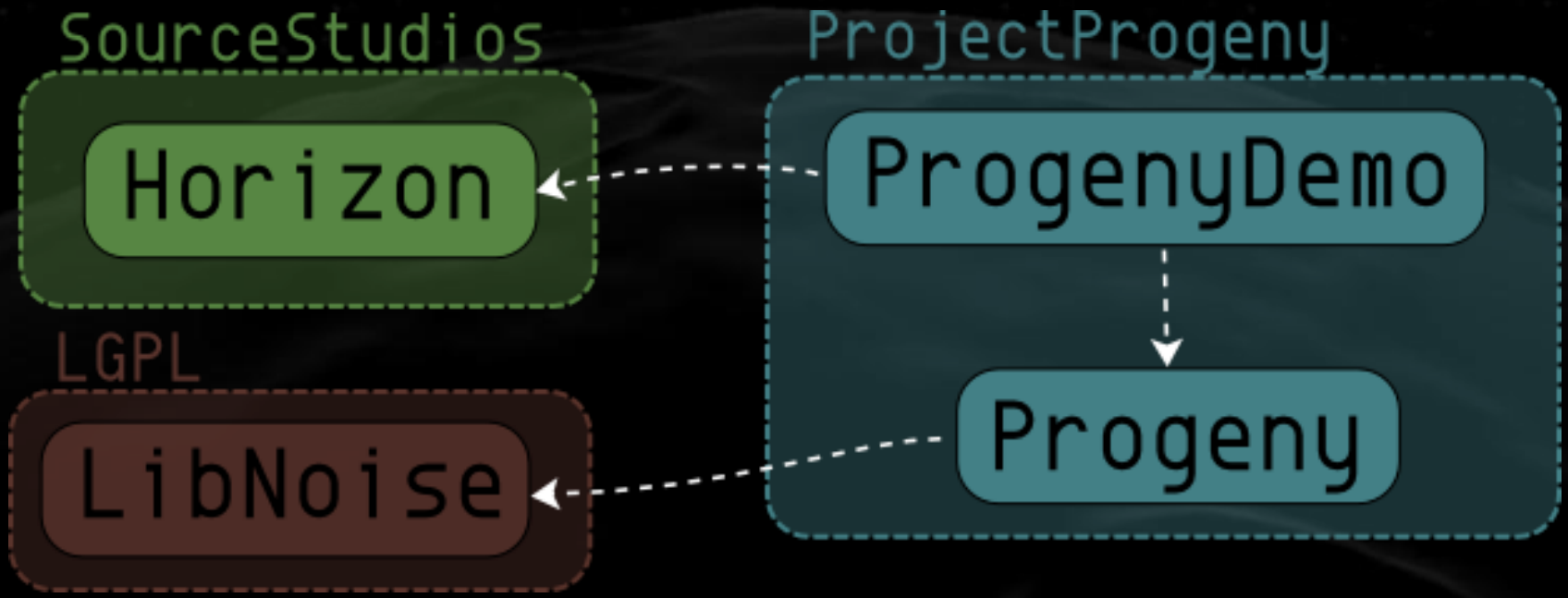


Rigid Multi - Mountains



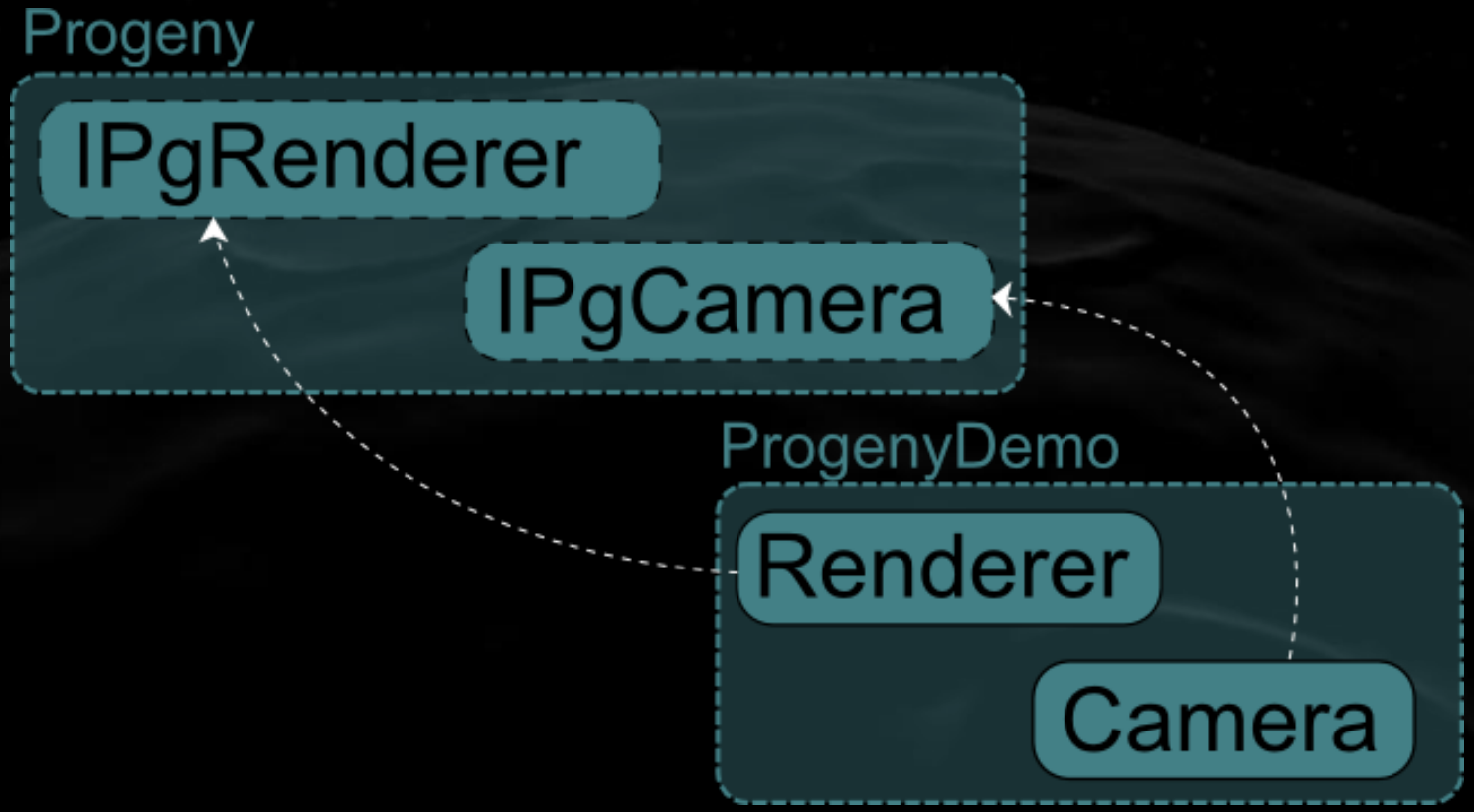
Project Layout

Project Dependencies



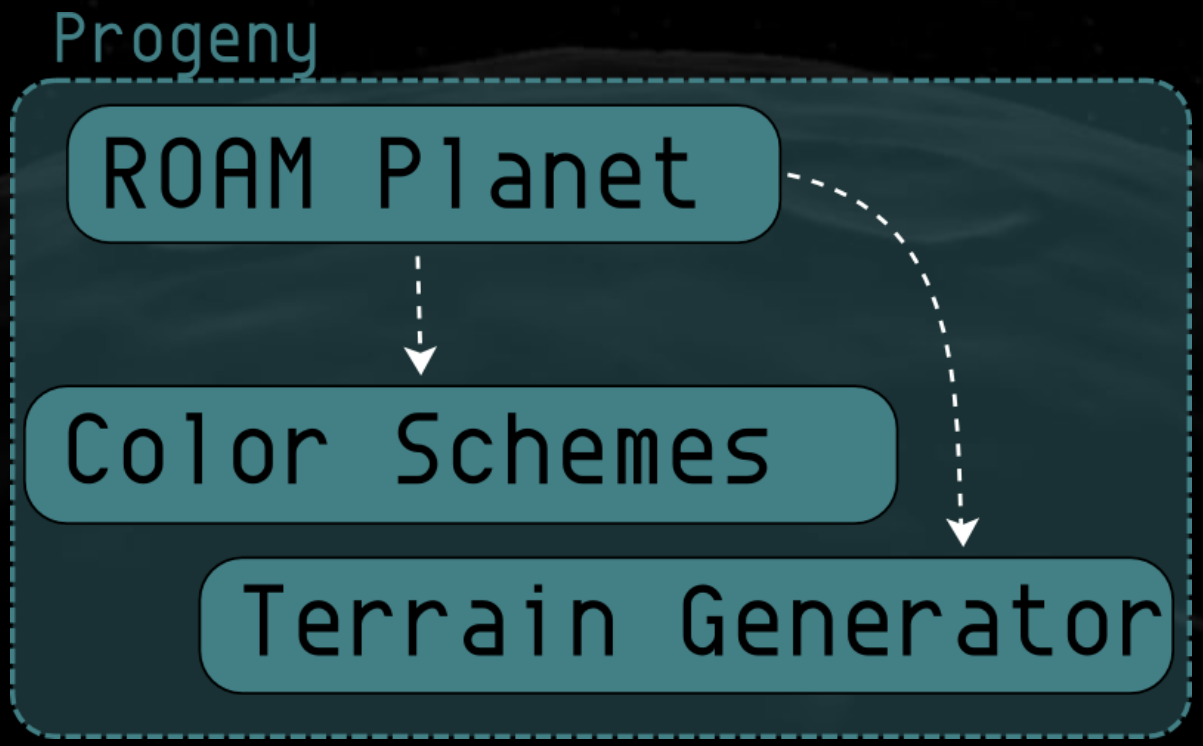
Progeny Interface Design

Progeny – Application Interface



Progeny Planet Design

Planet Dependencies

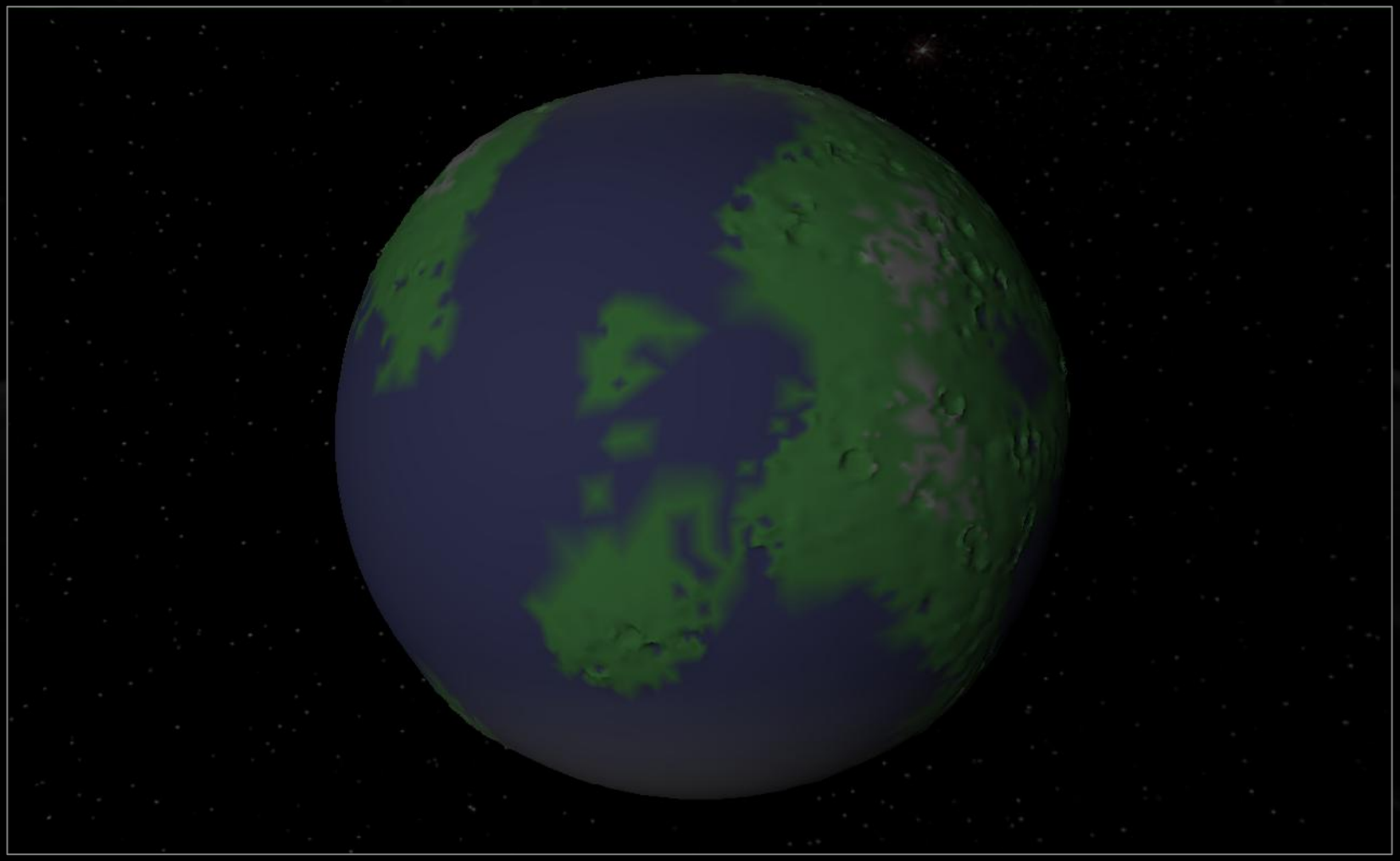


Parameterization

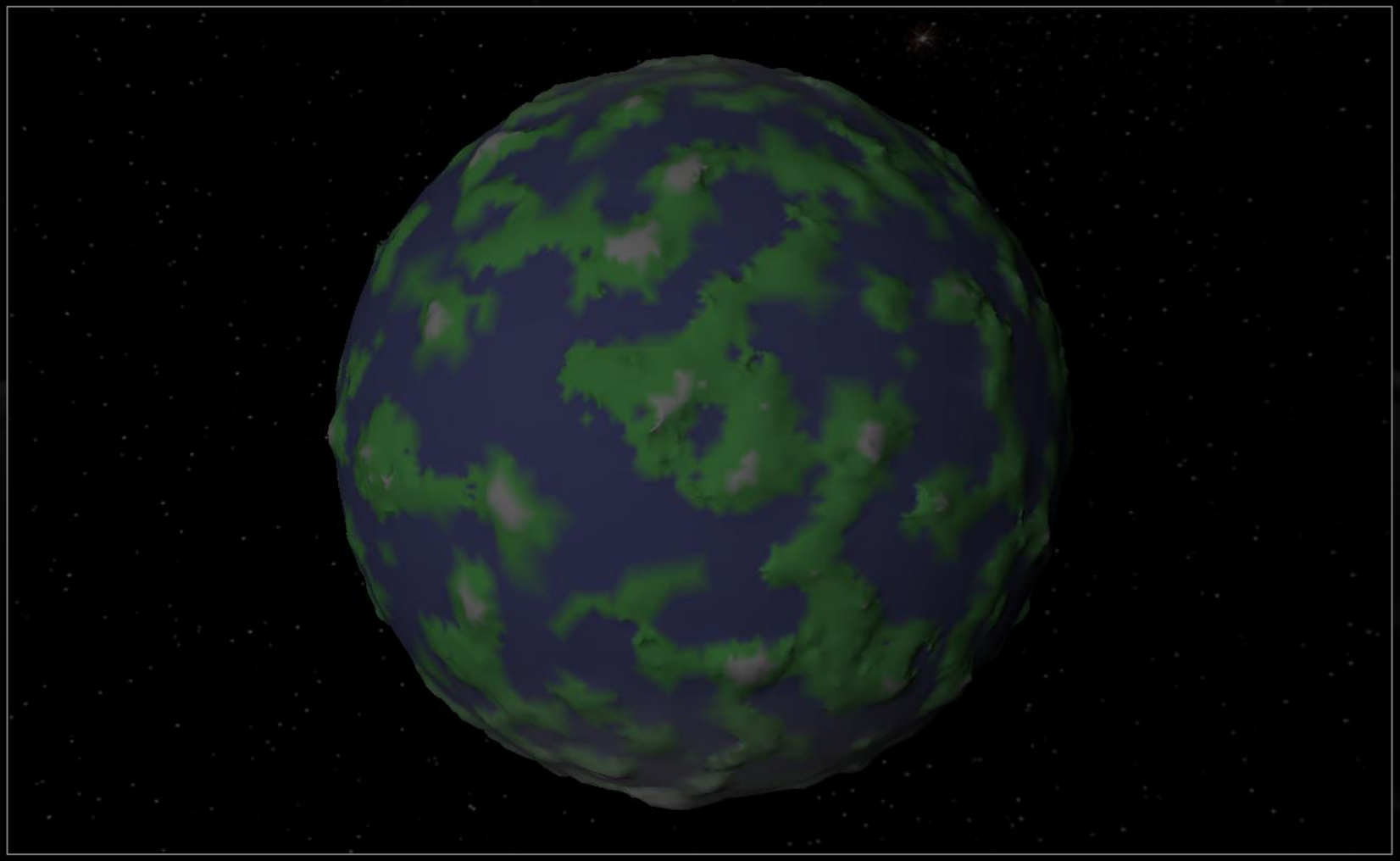
Planet Parameters

- Radius (2,000 km – 10,000 km)
- Continent frequency
- Mountain frequency
- Ocean height
- Craters
- Seed

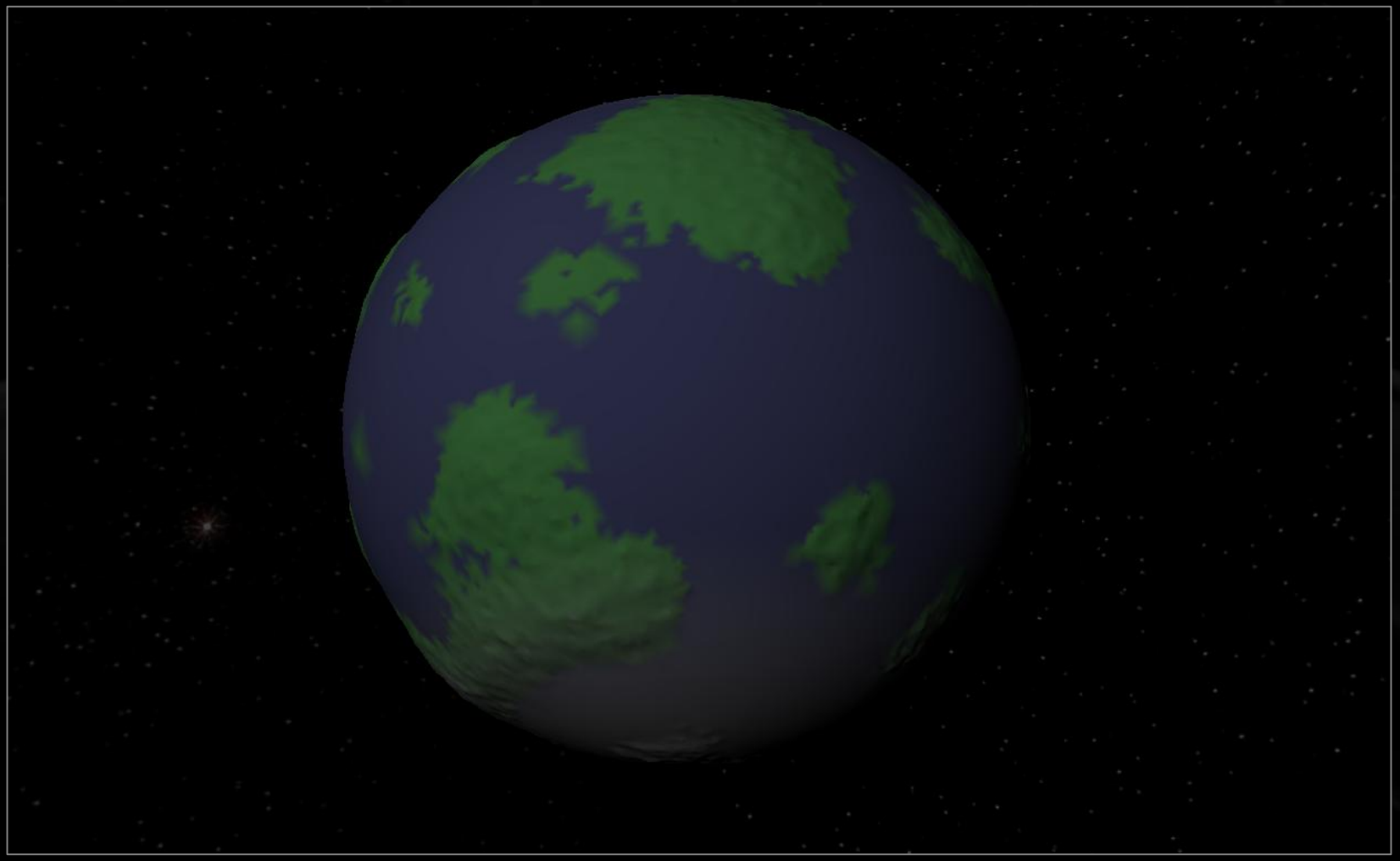
Low Continent Frequency



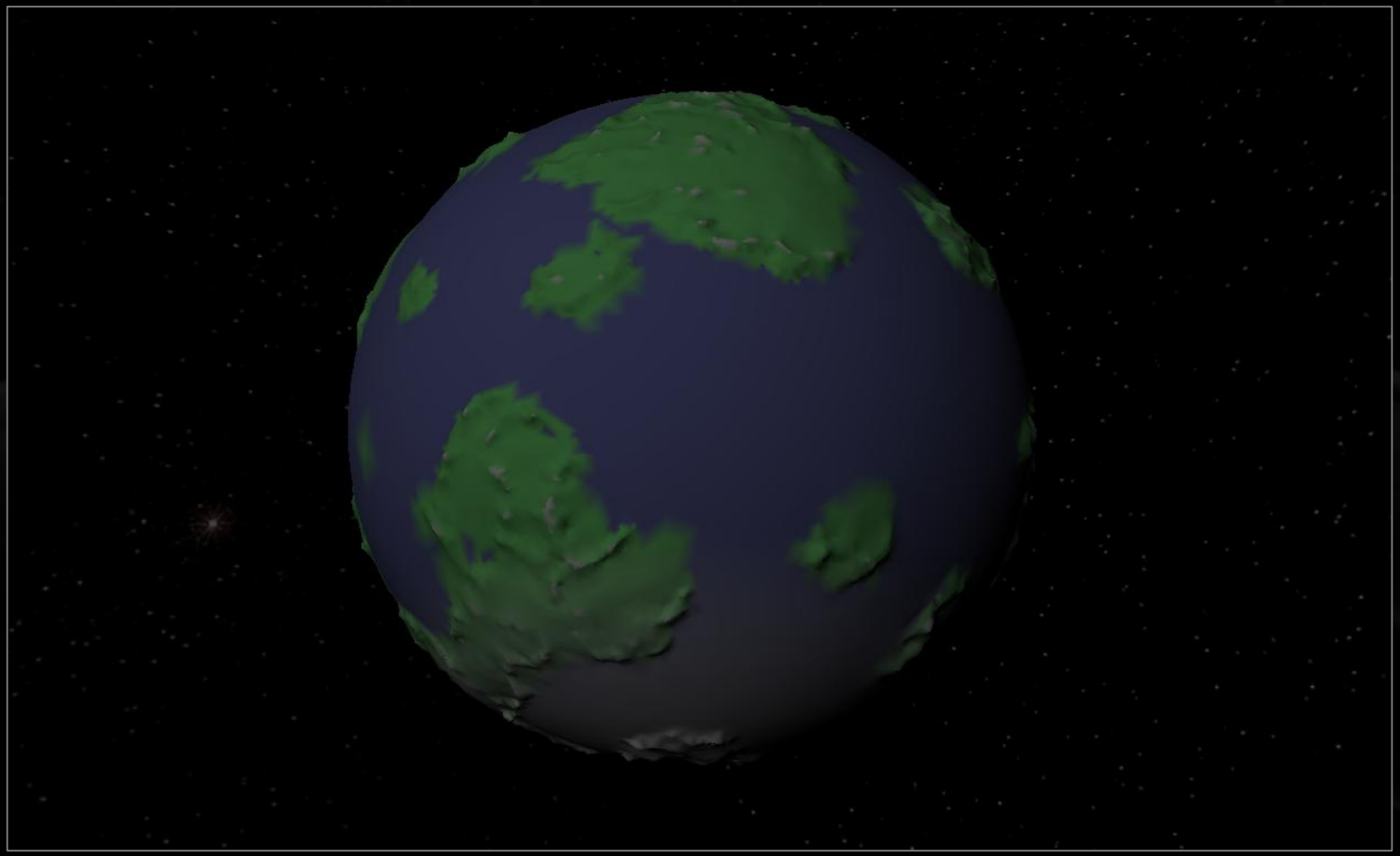
High Continent Frequency



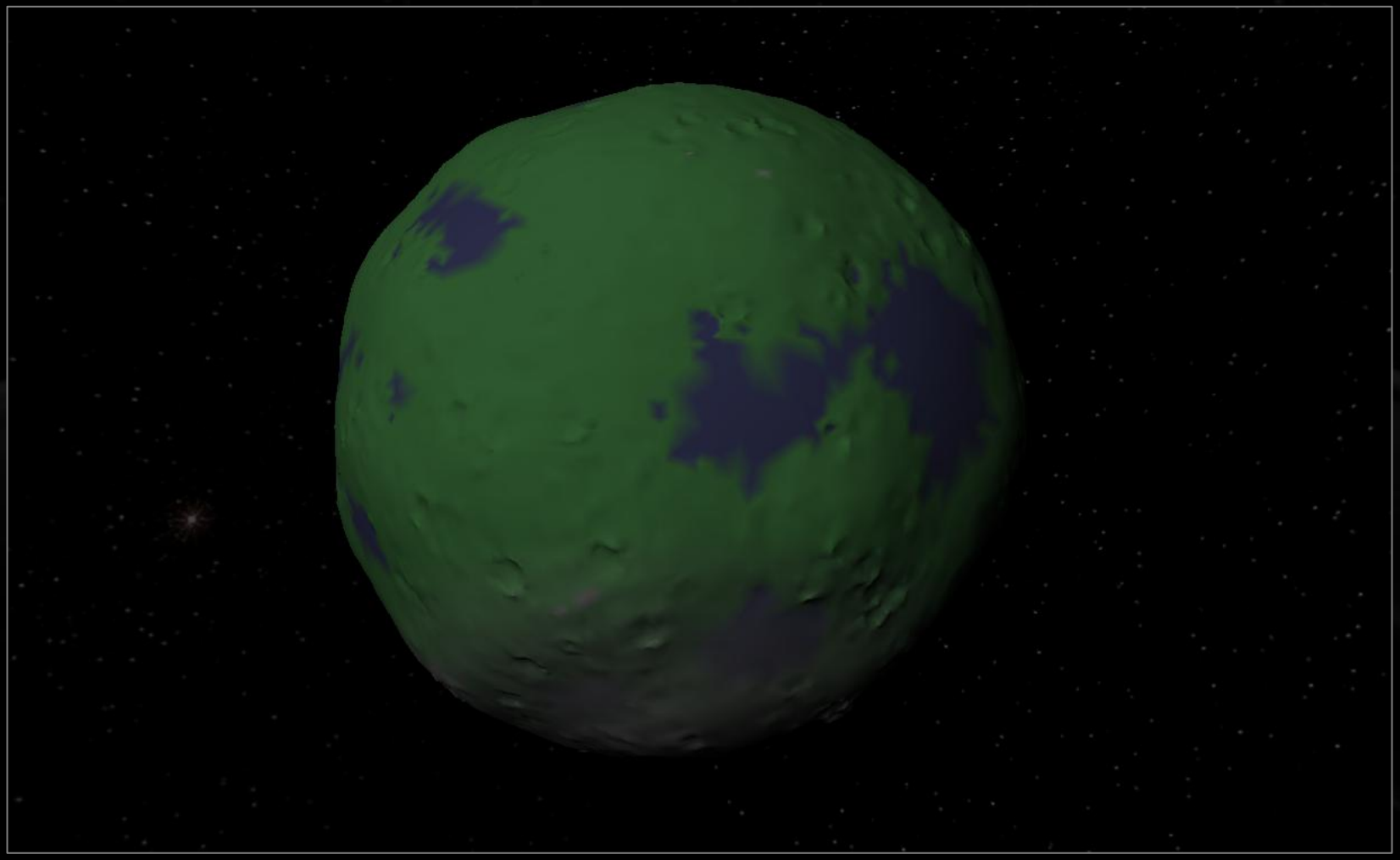
Low Mountain Frequency



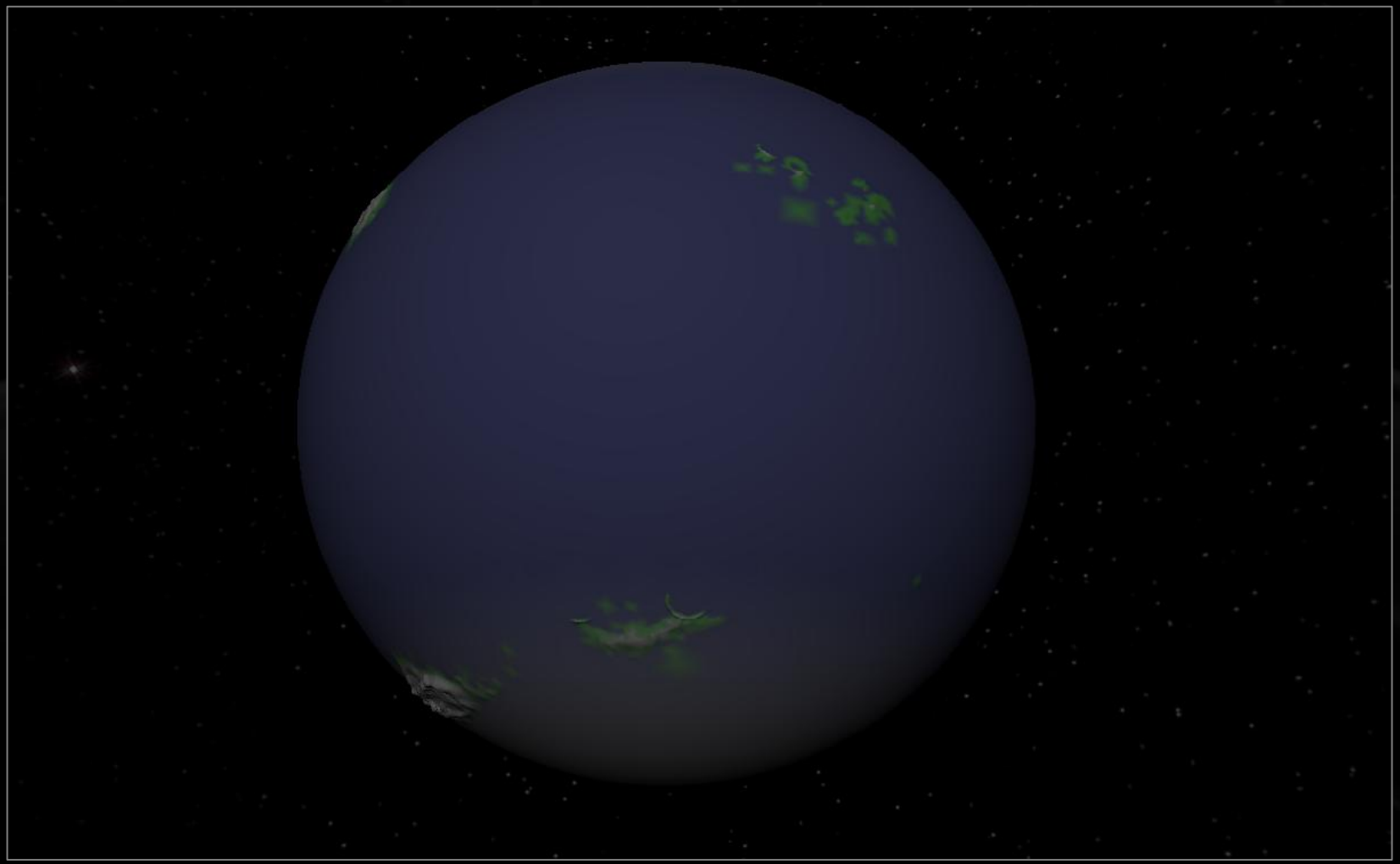
High Mountain Frequency



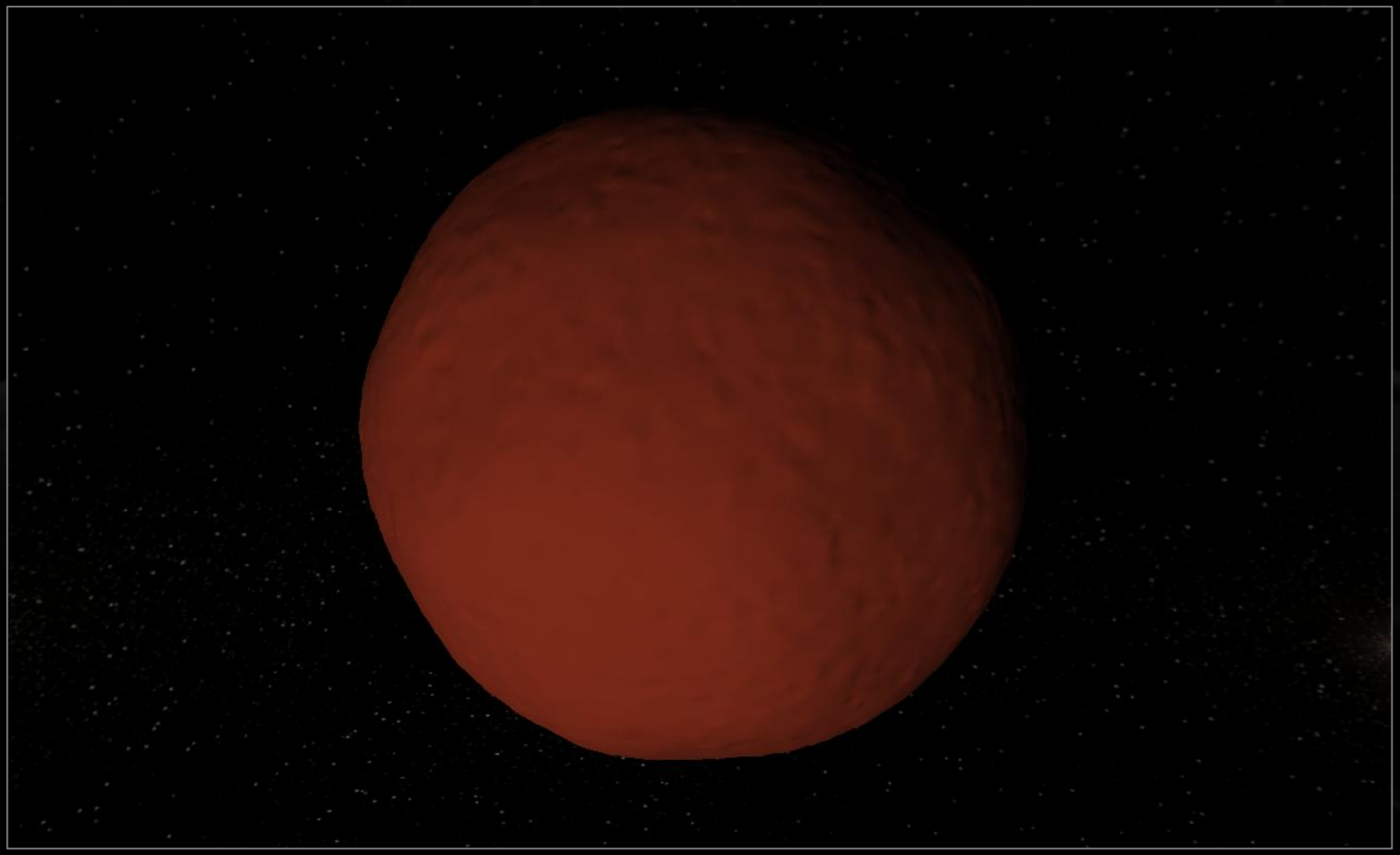
Low Ocean Height



High Ocean Height



No Craters



Craters

Implementation Results

Brief Video

Conclusions

- Library for generation of 3D art assets
  - Uses procedural techniques
- Ability to generate highly detailed planets in real-time
- Ability to parameterize the generated planets using meaningful attributes


Questions?