

Terrain procedural generation.

Jesús González¹, Ángela Sánchez² y Moisés Salmerón²

I. INTRODUCTION

II. MATHEMATICAL MODEL

First-class function.

Domain.

Value.

Gradient.

Higher-order function.

A. Terrain representation

Heightmap.

Height.

Normal.

Color.

B. Generic functions

Projection.

Inner composition.

Outer composition.

Generalized composition.

C. Primary arithmetic functions

Constant.

Addition.

Multiplication.

Min.

Sin.

D. Derived arithmetic functions

Subtraction.

Polynomials.

Linear interpolation.

Max.

Absolute value.

Smooth min.

Gradient noise.

Worley noise.

E. Coloration

Decorator.

F. Extensibility

Implicit modelling.

III. EXAMPLES

A. Notation

IV. IMPLEMENTATION

Declarative programming.

Static system.

A. Symbolic computation

Exact evaluation.

Approximation.

Integral calculus.

Compilation.

B. Factorization of computations

C. Factorization of dependencies

D. Parallelization

E. Dynamization

F. Performances

V. CONCLUSION AND FUTURE WORK

REFERENCES

¹Dpto. de Informática, Universidad de Tombuctú, e-mail: gonzales@tbt.edu.

²Dpto. de Arquitectura de Computadores, Universidad de Pernambuco, e-mail: [sanchez,salmeron}@per.edu](mailto:{sanchez,salmeron}@per.edu).