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Introduction

Foreword to special section on advances in procedural modeling

1. Introduction

Procedural modeling techniques and algorithms are widely used and explored in many professional applications. New algorithms covering areas such as vegetation modeling, urban simulation, furniture layout, and art design are being published and developed to unprecedented new levels. Despite the long history and wide acceptance of procedural modeling, many problems still prevail and should be addressed. This special issue is a collection of papers that present stimulating new procedural modeling methodologies in computer graphics. Four papers were carefully selected out of nine submissions. Each paper was reviewed by three to five reviewers that are experts in the field. Most of the papers required two to three reviewing cycles to be accepted.

Barroso et al. [1] introduces an editing tool to support procedural content creation. The authors present an end-to-end system for procedural copy and paste in a rule-based setting. As one of the main contributions of their system, they introduce a graph rewriting procedure for seamlessly gluing graphs and obtaining a consistent new procedural building ruleset.

The second paper, Pytel and Mann [2], addresses the topic of procedural-based terrain generation. The paper builds on a previous work on hydraulic erosion and introduces a new simulation method that achieves generation of realistic terrains by using a variant of avalanching, which is a principle followed by many physical self-organized systems. They also use the same approach to generate initial conditions for the erosion, so that the combined algorithm is a complete terrain modeling method based only on self-organization.

Løvset [3] shows how to procedurally generate a scaffold assembly from 3D building models. His paper automates the process of selecting and placing scaffold components in order to design an optimal scaffold assembly for a specific building. The resulting assembly is physically possible, is practical to use for the workers, and satisfies governmental rules and regulations. The result from their automated process is compared to a scaffold design produced manually by a professional scaffold designer.

The last paper, Huang et al. [4], proposes a grammar-based procedural approach for modeling of grape bunches. The formal rules of an open L-system are used to model almost all types of grape bunches. When growing a specific grape bunch, the overall shape for controlling the development is given by users through the provided user interface. The user interface determines the parameters used for the procedural rules. An interaction simulation process then simulates the natural thinning effect between newborn internodes and the existing grape structure via a communication module that adjusts the growing directions of branches, twigs and berries during the interpretation of the generated string.

References

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