

Simulation and Visualization of Plant Growth using Lindenmayer Systems

S. Chuai-Aree¹, W. Jäger¹, H. G. Bock¹, and S. Siripant²

Abstract: Lindenmayer systems (L-systems) were introduced by Aristid Lindenmayer to generate the geometrical structures, i.e. plant, leaf, or root structures. During the last decade in L-systems prototype, the plant growth has been animated by composing images from all iterations. The problem is the development of plant model at each time step is nonsmooth and discontinuous. In this paper, we solve this problem by adding some mathematical time functions of logistic growth to each component and combine with an L-system prototype. The stochastic and bracketed L-systems are applied to generate the stochastic structure and branching structure, respectively. Our L-system prototype can generate both plant shoot and root parts. The results of simulation and visualization are presented. These show that the simulation and visualization of the development of the plant growth modeled by using the new proposed method is smoother and more natural.

¹ Interdisciplinary Center for Scientific Computing, University of Heidelberg
Im Neuenheimer Feld 368, 69120 Heidelberg, Germany
Somporn.ChuaiAree@iwr.uni-heidelberg.de
Wjaeger@iwr.uni-heidelberg.de
Bock@iwr.uni-heidelberg.de

² Advance Virtual and Intelligent Computing Center (AVIC), Chulalongkorn University
Phayathai road, Bangkok 10330, Thailand
Suchada.S@chula.ac.th