

Computer Graphics II

1: Introduction

Computer Graphics and
Multimedia Systems Group

University of Siegen



Lectures in the Winter Term 2013/2014



Course	Teacher	Type	Time & Place
Computer Graphics II (CG-II)	Kolb Bader	2L 2E	Mon. 10-12 H-F 116 Thu. 12-14 H-C 6336
Computer Graphics III (CG-III)	Lambers Lambers	2L 2E	Thu. 08-10 H-F 112 Thu. 10-12 H-A 7118
Sci. Visualization (VIS)	Kolb Lambers	2L 2E	Fri. 10-12 H-F 014 Fri. 12-14 H-A 7118
Comp. Graphics Seminar	Lambers	2S	Wed. 16-18 H-A 7118
Modeling & Animat. (Maya)	Pätzold	3P	Tue. 14-16 H-A 7118
Project Group Crazy Machines in VR	Lambers Lefloch		Mon. 16-18 H-A 7114
CG Colloquium (CGKoll)	Kolb		Fri. 14-16 H-F 114



Lecture slides: Under construction; published during semester

- Access via

www.cg.informatik.uni-siegen.de/de/computergraphik-ii-2013w

- User/Password:

Exercise: Instructor Julian Bader and Hendrik Hochstetter

- Work in groups of 2 students
- Online registration via LSF is required

Exercise certificate: Required for examen (Dept. ET-I, Mathematik)

- Hand in: Tue. **AT BEGINNING** of exercise
- Required: At least 50% of all points
- First exercise this week (17.10.) **you can obtain points**
- First exercise sheet: Handin on **24.10.**

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Motivation and Lecture Content



CG1 focussed on *generative computer graphics*:

- Hardware accelerated image generation (graphics pipeline)
- Photo realistic images (raytracing)

What is missing? Essential for *3D graphics applications* are

- complex (realistic) geometric models (charakters, cars, etc.)
- (Realistic) motion and dynamics of objects (partially → VR)
- Realistic material → CG-III



Geri's Game, Pixar, 1997



Pontiac design study (Maya)

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Geometric models: Foundations of

- ① representation of geometric models, i.e.
 - ① Freeform curves and surfaces
 - ② Polygonal meshes
 - ③ Subdivision surfaces
- ② Generation schemes for complex models

Animation: Variation of model parameters (*animation parameters*) over time

- ① Key frame animation
- ② Spline based animation, e.g. for camera movement
- ③ Deformations
- ④ Articulated objects

Literature and Referenzen

Bungartz, Griebel & Zenger: Einführung in die Computergraphik, Vieweg 2002

Parent: Computer Animation – Algorithms and Techniques, Morgan Kaufman, 2012

Eberly: 3D Game Engine Design, Morgan Kaufman, 2007

Akenine-Möller & Haines: Real-Time Rendering, AK Peters, 2008

Goldman: Pyramid Algorithms, Morgan Kaufman, 2003

graphics.idav.ucdavis.edu/education/CAGDNotes/homepage.html

Points, vectors, Bernstein-Bézierpolynomials, Béziercurves and surfaces, B-splines, Catmull-Rom splines

www.geom.uiuc.edu/docs/reference/CRC-formulas/ General information about geometry formulas and facts

www.cs.mtu.edu/~shene/COURSES/cs3621/NOTES/notes.html Curves and surfaces

paulbourke.net/geometry/ Geometry, surfaces, curves, polyhedra, intersection calculus

paulbourke.net/fractals Introduction to fractals

www.gamasutra.com Articles to various topics of this lecture