



The South African Institute of Computer Science
and
Information Technology

The 1997 National
Research and
Development
Conference

Riverside Sun
Vanderbijlpark
13 & 14 November

Hosted by



Potchefstroomse Universiteit
vir Christelike Hoër Onderwys

The Department of Computer Science and Information Systems
Potchefstroom University for Christian Higher Education
Vaal Triangle Campus

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PROCEEDINGS

Edited by L.M. Venter & R.R. Lombard



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and
Information Technology

Proceedings
of the
The 1997 National
Research and
Development
Conference
Towards 2000

Riverside Sun
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13 & 14 November

Edited by
L.M. Venter
R.R. Lombard

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Foreword

This book contains a collection of papers presented at a Research and Development conference of the South African Institute of Computer Scientists and Information Technologists (SAICSIT). The conference was held on 13 & 14 November 1997 at the Riverside Sun, Vanderbijlpark. Most of the organization for the conference was done by the Department of Computer Science and Information Technology of the Vaal Triangle Campus, Potchefstroom University for Christian Higher Education.

The programming committee accepted a wide selection of papers for the conference. The papers range from detailed technical research work to reports of work in progress. The papers originate mainly from Academia, but also describe work done in and for Industry. It is hoped that the papers give a true reflection of the current research scene in Computer Science and Information Technology in South Africa. Since one of the aims of the conference is Research development, the papers were not subjected to a refereeing process.

A number of people spent numerous hours helping with the organization of this conference. In this regard, we wish to thank the members of the Organizing committee, and the Programming committee who had very little time to screen the abstracts and compile the program. A special thanks goes to the secretary of the department, Mrs Helei Jooste, whose very able work was interrupted by the birth of her first child.

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Liming-like Curve Constructions

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Abstract:

R.A. Liming developed a method based on classical conic section theory to design cross-sections of aircraft using implicit rather than explicit forms of the quadratic equations. In its basic form the method is used to construct a one-parameter family of conics through four points or, equivalently, a family tangential to two given lines at two points. The parameter, known as the Liming multiplier, is then adjusted to ensure that the conic passes through a fifth chosen point. This method is more stable than the more common approach of two-dimensional interpolation with a general quadratic equation in two variables.

The method can be extended to the construction of higher order curves, with applications in computer-aided design and computer graphics. The method results in the efficient use of a hierarchy of algorithms that can be combined to construct curves of increasing complexity. Since all the curves are in implicit form, this also necessitates the development of algorithms for the efficient and aesthetically pleasing graphics representation of higher order curves.

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