Robert Barnhill

Topics in computer aided geometric design

TOPICS IN COMPUTER
AIDED GEOMETRIC DESIGN

During a beautiful Sicilian week in May (12-19), 1990, a working conference was held on the subject, « Topics in Computer Aided Geometric Design », at the Ettore Majorana International Centre for Scientific Culture, Erice, Sicily The mathematical ambience was enhanced with the heritage of Pythagoras as the « tyrant of Selinunte », a nearby ancient city The conference was unique in its pursuit of state-of-the-art science in a medieval environment The conference was led by Drs M Bercovier and V Capasso with assistance from Drs R Barnhill, W Boehm and J Hoschek

The purpose of the conference was « to make an authoritative review of CAGD to date, as well as to develop new topics » The papers in this Volume give a permanent record of the successful completion of this task Difficult curve design topics, such as achieving appropriate smoothness and fairness are represented Surface design, both three-dimensional and for « surfaces defined on surfaces », is becoming increasingly important in CAGD Variational methods, the basis for splines as well as for, say, the finite element methods continues to be fruitful

At a lower level of detail, this Volume includes the following topics surface design of the Clough-Tocher type (Farin and Kashyap), two papers related to the emerging subject of « surfaces on surfaces » for spheres (Hoschek and Seemann, Prautzsch), « geometry processing » including intersections, contouring, and integration (Barnhill), trivariate contouring (Hamann), quadric surfaces (Boehm and Hansford), curvature analysis for higher-dimensional surfaces (Chuang and Hoffmann), variational methods for curves and surfaces (Bercovier and Jacobi, Nowacki, Kaklis and Weber, Micchelli), and smoothness of curves and surfaces (Dyn, Levin and Yad-Shalom, Seidel)

Computer Aided Geometric Design is a subject with the dual charm of scientific interest and practical application This Volume contains several new themes, for example, higher dimensional surfaces, which are likely to become of practical use in the near future Thus this Volume can be read both for the subject matter's intrinsic interest as well as possible future utility

<div align="right">Robert Barnhill</div>