Elementary Geometry of Differentiable Curves: An Undergraduate Introduction

By C. G. Gibson

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Here is a genuine introduction to the differential geometry of plane curves for undergraduates in mathematics, or postgraduates and researchers in the engineering and physical sciences. This well-illustrated text contains several hundred worked examples and exercises, making it suitable for adoption as a course text. Key concepts are illustrated by named curves, of historical and scientific significance, leading to the central idea of curvature. The author introduces the core material of classical kinematics, developing the geometry of trajectories via the ideas of roulettes and centrodes, and culminating in the inflexion circle and cubic of stationary curvature.

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Editorial Review

Review
"This book is pleasant for a student...It contains many interesting properties and features of curves which usually are not shown in a regular undergraduate course." Mathematical Reviews

About the Author
Chris Gibson received an honours degree in Mathematics from St Andrews University in 1963, and later the degrees of Drs Math and Dr Math from the University of Amsterdam, returning to England in 1967 to begin his 35 year mathematics career at the University of Liverpool. His interests turned towards the geometric areas, and he was a founder member of the Liverpool Singularities Group until his retirement in 2002 as Reader in Pure Mathematics, with over 60 published papers in that area. In 1974 he co-authored the significant Topological Stability of Smooth Mappings, presenting the first detailed proof of Thom's Topological Stability Theorem. In addition to purely theoretical work in singularity theory, he jointly applied singular methods to specific questions about caustics arising in the physical sciences. His later interests lay largely in the applications to theoretical kinematics, and to problems arising in theoretical robotics. This interest gave rise to a substantial collaboration with Professor K. H. Hunt in the Universities of Monash and Melbourne, and produced a formal classification of screw systems. At the teaching level his major contribution was to pioneer the re-introduction of undergraduate geometry teaching. The practical experience of many years of undergraduate teaching was distilled into three undergraduate texts published by Cambridge University Press, now widely adopted internationally for undergraduate (and graduate) teaching.

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