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A solid introduction to the methods of differential geometry and tensor calculus, this volume is suitable for advanced undergraduate and graduate students of mathematics, physics, and engineering.

Show Context Citation Context By convention, all functions of x and its derivatives are implicitly evaluated at u0,v0. In this paper we first present the classical maximum principle due to E. We emphasize the comparison technique invented by Hopf to prove this principle, which has since become a main mathematica We emphasize the comparison technique invented by Hopf to prove this principle, which has since become a main mathematical tool for the study of second order elliptic partial differential equations and has generated an enormous number of important applications. In particular, we shall treat and discuss recent generalizations of the strong maximum principle, and also the compact support principle, for the case of singular quasilinear ellip-tic differential inequalities, under generally weak assumptions on the quasilinear operators and the nonlinearities involved. Our principal interest is in necessary and sufficient con-ditions for the validity of both principles; in exposing and simplifying earlier proofs of corresponding results [41], [30], [27] ; and in extending the conclusions to wider classes of singular operators than previously considered. The results have unexpected ramifications for other problems, as will develop from the Show Context Citation Context Understanding the link between differential growth and form is necessary for understanding the morphogenesis of living organisms. This thesis describes two tools for simulating the growth of surfaces in three dimensions. These tools make it possible to explore the link between differential growth an These tools make it possible to explore the link between differential growth and form, and link growth to pattern formation traditionally considered outside of growth. Surface growth is controlled by diffusible morphogens which can be interactively placed, or predefined. The morphogens can diffuse, decay and interact. Two different techniques, a mass-spring system and finite element analysis, are used to simulate the physics of the surface. A number of test cases are presented. The first example is a model of sea urchin development. Secondly the dorsal petal lobes and leaves of the Antirrhinum majus snapdragon are examined. Finally, an oscillating genetic network is used to control the growth of a surface, creating some novel forms. The response of an array processing system has been widely modelled using the concept of the array manifold. The conventional array manifold is a function of the geometry of the array, the carrier frequency and the directions of arrival DOAs of the sources only. However, the emergence of more soph However, the emergence of more sophisticated array systems, for instance antenna array communication systems, dictates the extension of this array manifold into various new types of manifolds that incorporate additional system and channel parame-ters, such as the code-division multiple access CDMA spreading and scrambling codes, the lack of synchronization, Doppler ef-fects, polarization parameters, subcarriers, etc. This paper is con-cerned with the definition and geometric investigation of a generic model for these new manifolds that can be expressed as functions of the conventional array manifolds and, hence, are defined herein as extended array manifolds. Thus, initially, the concept of the extended array manifold is introduced and is shown to accommodate both existing and newly defined extensions of the widely employed in the literature conventional or spatial array manifold. Next, the geometric properties and parameters of the extended array manifold are studied and linked with the properties of the associated spatial array manifold in an attempt to facilitate the geometric study of the former by taking advantage of the well understood study of the latter.

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The author of four influential books on differential geometry, T. J. Willmore () was a Professor at the University of Durham and Liverpool University. He is best remembered as the developer of a branch of differential geometry known as Willmore surfaces, an area with applications extending to particle physics and colloidal chemistry.

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