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Nonlinear differential equations, by S. Fucik and A. Kufner, Studies in Applied Mechanics, vol. 2, Elsevier, New York, 1980, 359 pp., $83.00.

Recently three closely guarded secrets of modern mathematics and science have been revealed. They are

(i) the understanding of genuine nonlinear phenomena lies at the heart of many important problems in diverse areas of knowledge;

(ii) these nonlinear phenomena can often be adequately described by studying systems of nonlinear differential equations;

(iii) there are simple systematic mathematical ideas and techniques that are adequate to treat broad classes of these nonlinear systems. Moreover, when such ideas do not exist, they are being keenly pursued world-wide by many researchers, young and old.

Thus, each day seems to bring additional insights and significant mathematical results connecting the three facts mentioned above. These results are attained not only by professional mathematicians, but also by mathematically trained scientists and engineers whose work forces them to solve these problems.

All those who love mathematics have cause to rejoice since many modern mathematical areas developed until now for their own sake (e.g. homotopy groups of spheres and simple Lie groups, abelian functions, singularity theory, and the differential geometry of connections) are absolutely essential for the understanding of key nonlinear problems of science. These problems in turn spawn new fruitful directions of depth and subtlety for mathematics and science. Hidden links between diverse mathematical areas are being revealed. In short, we are witnessing the making of a new mathematical and scientific revolution.

The book under review explains some known (functional analysis) methods for certain classes of boundary value problems for certain nonlinear differential equations. The authors limit themselves to nonlinear elliptic equations