

cation problems are treated by topological and analytical techniques. Applications are discussed. The final part is devoted to analysis in the large. The Leray-Schauder degree is developed as well as degree for  $C^2$  Fredholm maps. These, and related notions, are used to investigate nonlinear boundary value problems. Critical point theory, with applications, completes the book.

Globally, I very much like the spirit and the scope of the book. The writing is lively, the material is diverse and yet maintains a certain unity, and the interplay between the abstract analysis and certain concrete problems is emphasized throughout. Locally, more attention could have been paid to detail; there are many misprints, some mistatements of results, and some proofs need tightening. On balance, the book is a very useful contribution to the growing literature on this circle of ideas, and I look forward to the author's promised companion volume.

#### REFERENCES

1. G. D. Birkhoff, *Dynamical systems with two degrees of freedom*, Trans. Amer. Math. Soc. **18** (1917), 199–300.
2. G. D. Birkhoff and O. D. Kellogg, *Invariant points in function space*, Trans. Amer. Math. Soc. **23** (1922), 96–115.
3. S. Banach, *Sur les opérations dans les ensembles abstraits et leurs applications aux équations intégrales*, Fund. Math. **3** (1922), 133–181.
4. J. Leray and J. Schauder, *Topologie et équations fonctionnelles*, Ann. Sci. École Norm. Sup. **51** (1934), 45–78.
5. V. I. Lomonosov, *Invariant subspaces for the family of operators which commute with a completely continuous operator*, Functional Anal. Appl. **8** (1973), 213–214.
6. L. Lyusternik, *The topology of the calculus of variations in the large*, Transl. Math. Monographs, vol. 16, Amer. Math. Soc., Providence, R.I., 1966.
7. M. Morse, *The calculus of variations in the large*, Amer. Math. Soc. Colloq. Publ., no. 18, Amer. Math. Soc., Providence, R.I., 1934.
8. J. Schauder, *Der Fixpunktsatz in Funktionalräumen*, Studia Math. **2** (1930), 171–180.

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*Combinatorial set theory*, by Neil H. Williams, North-Holland Publishing Company, Amsterdam, New York, Oxford, 1977, xi + 202 pp., \$26.75.

Combinatorial set theory is frequently distinguished from axiomatic set theory, although the distinction is becoming less and less clear all the time. If there is a difference, it is more one of method than substance. Axiomatic set theory uses the tools of mathematical logic, such as the method of ultrapowers and the theory of forcing and generic sets, while the methods of combinatorial set theory are purely “combinatorial” in nature. In practice, an argument or result is “combinatorial” if it is *not* overtly model-theoretic, topological, or measure-theoretic.

Both branches of set theory experienced explosions in interest at about the same time, in the middle 1960s, but at widely separated places. Combinatorial set theory grew up around Erdős and his school, in Budapest, while axiomatic set theory received its impetus from the work of Cohen, Scott and Solovay at