In order to explain the applications to Markov processes it is necessary to extend the theory to trajectories in the space of distributions (in the sense of probability theory) induced by the semigroup of a Markov process–for example, Brownian motion. For measure dynamics thus extended, the objects of interest become positive contractions of L_1 instead of measure-preserving transformations of the underlying space. The proof of the maximal ergodic theorem may then be viewed as a statement about the potential theory, the balayage and the stopping times of the underlying Markov process. There are many other results as well which unite measure dynamics, potential theory and the theory of Markov processes. Regrettably, Sinai's book includes no discussion of these ideas, though it would have been quite possible to develop them in keeping with the spirit of the book, by considering special cases–the random walk, for example.

Professor Sinai's lectures are beautifully written. Our criticism may be summarized by saying simply that they end too soon. We hope that Professor Sinai will publish a sequel adding problems which will illustrate more clearly the mathematical applications of ergodic theory and which will go further in developing the theory in general terms.

REFERENCES

1. G. D. Birkhoff, *Dynamical systems*, Amer. Math. Soc. Colloq. Publ., vol. 9, Amer. Math. Soc., Providence, R.I., 1927.

2. L. Boltzmann, *Lectures on gas theory*, Univ. of California Press, Berkeley, Calif., 1964 [Translation of *Gastheorie*, 1896–1898].

3. H. Poincaré, *Mémoire sur les courbes définies par une équation différentielle*, J. de Math. 7 (1881), 375–422.

4. J. T. Schwartz, *The pernicious influence of mathematics on science*, Proc. Internat. Congr. for Logic, Methodology and Philosophy of Science, Berkeley, Calif., 1960.

5. C. L. Siegel and J. K. Moser, *Lectures on celestial mechanics*, Springer-Verlag, Berlin and New York, 1971.

6. E. T. Whittaker, *Analytical dynamics of particles and rigid bodies*, Cambridge Univ. Press, New York, 1936.

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Vorlesungen über numerische Mathematik, by Heinz Rutishauser, Birkhäuser Verlag, Basel, Switzerland, Bands 1 and 2, 1976, 164 pp. and 229 pp., Fr/DM 40,48.

The two volumes under review here are elementary lecture notes on numerical analysis written by Heinz Rutishauser before his premature death in 1970 at the age of fifty-two. Although Rutishauser intended ultimately to publish these notes as a textbook, they were by no means in final form at his death, and in spite of the able editorship of Martin Gutknecht they remain somewhat rough-hewn and not a little out of date. Nonetheless, Rutishauser was one of the most successful and respected workers in this field, and it is not surprising that his notes represent one of the best introductions to numerical analysis as it is actually practiced.