54 [2.15].—D. S. MITRINOVIC, R. S. MITRINOVIC & S. S. TURAJLIC, "A table of coeffi-
cients for numerical differentiation," *Publ. Fac. Élect. Univ. Belgrade (Série:
Math. et Phys.)*, No. 247–No. 273, 1969, pp. 115–122.

This table appears in the publication numbered 264 in this compilation of recent
papers in mathematics and physics by members of the faculty of the University of
Belgrade. It consists of exact (rational) values of the coefficients $A_{r,n}$ for $r = 1(1)30$,
$n = r(1)30$ in Markoff's formula for the rth derivative in terms of forward differences.
These values were computed (partly on an Olivetti desk calculator and partly on
an IBM 1130 system) by use of the formula $A_{r,n} = r!S_n^r/n!$, where S_n^r is a Stirling
number of the first kind.

In the preparation of this extensive table the authors confirmed the accuracy
of the table of Lowan, Salzer and Hillman [1], which was previously the most extensive
in the literature.

J. W. W.

1. A. N. LOWAN, H. E. SALZER & A. HILLMAN, "A table of coefficients for numerical
differentiation," *Bull. Amer. Math. Soc.*, v. 48, 1942, pp. 920–924.

55 [2.35, 8, 13. 25, 13.35].—M. T. WASAN, *Stochastic Approximation*, Cambridge
Univ. Press, New York, 1969, viii + 202 pp., 22 cm. Price $9.50.

A stochastic approximation method is an iterative procedure by means of which
successive values of a parameter are generated and corresponding random samples
are observed. For example, the parameter may be the dosage of a new drug and the
observations are then the responses. A scheme is set up so that these values converge
stochastically in some sense to the desired quantity, such as the mean of an unknown
quantity (the critical dosage). A typical scheme, due to Monro-Robbins (1951) and
having its origin in bioassay, looks like this:

$$x_{n+1} = x_n - cn^{-1}[y(x_n) - \alpha].$$

Older methods go back to Newton in numerical solutions of equations and to the
nonstochastic up-and-down method. Kiefer and Wolfowitz considered a stochastic
method for determining the location of the maximum of a regression function. A lot
of work was done from the fifties down to recent years. This monograph collects
the results of many authors, discusses (i) the conditions under which the method
gives a valid approximation to the required solution, (ii) methods for optimal choice
of parameters to hasten convergence, and (iii) comparisons with other techniques.
The stochastic process involved is usually a nonstationary Markov chain of a very
special kind, and the mathematical content of the results boils down to upper and
lower bounds for moments and related quantities, and sometimes their asymptotic
behavior. The prototypes of such inequalities, given by the reviewer to establish
asymptotic normality, and ramified by Burkholder, Derman, Sacks, and others, are
collected with detailed proofs in an appendix. There are many examples, applica-
tions and references to sources. Although the book is not for browsing, by the nature
of the subject, the author has written a readable account for readers who are ready