

CONTENTS

Preface		xi
1. Basic Formulas		1
1.1	Introduction	1
1.2	The Generalized Hypergeometric Function and the G-Function	1
1.3	Expansion of ${}_pF_q(z)$ and $G_{\rho+1,q}^{q-r,1}(z)$, $r = 0$ or $r = 1$, in Series of Chebyshev Polynomials of the First Kind	4
1.4	Efficient Evaluation of Series of Chebyshev Polynomials	17
1.5	Rational Approximations for Generalized Hypergeometric Functions	20
1.6	The Padé Table	27
1.7	Computations of and Checks on Coefficients and Tables	29
1.8	Tables of the Functions e^{-x} and e^{-x}	35
2. Identification of Functions		41
2.1	Introduction	41
2.2	The Generalized Hypergeometric Function ${}_pF_q(z)$	41
2.3	The G-Function	47
2.4	Miscellaneous Functions	48
3. General Remarks on the Algorithms and Programs		49
3.1	Introduction	49
3.2	Precision and Complex Arithmetic	49
4. Chebyshev Coefficients for ${}_2F_1(a,b;c;z)$		52

5. Coefficients for the Expansion of the Confluent Hypergeometric Function ${}_1F_1(a;c;z)$ in Ascending Series of Chebyshev Polynomials	70
6. Chebyshev Coefficients for ${}_0F_1(c;z)$	77
7. Coefficients for the Expansion of ${}_1F_2(a;b,c;z)$ in Ascending Series of Chebyshev Polynomials	82
8. Coefficients for the Expansion of the Confluent Hypergeometric Functions $U(a;c;z)$ and ${}_1F_1(a;c;-z)$ in Descending Series of Chebyshev Polynomials	88
9. Coefficients for the Expansion of the Functions $G_{1,3}^{m,1}(z^2/4 _{a,b,c}^1)$, $m = 3$ or $m = 2$, in Descending Series of Chebyshev Polynomials	101
10. Differential and Integral Properties of Expansions in Series of Chebyshev Polynomials of the First Kind	116
11. Expansion of Exponential Type Integrals in Series of Chebyshev Polynomials of the First Kind	126
11.1 Introduction	126
11.2 The Representation for $g(x)$	127
11.3 The Representation for $G(x)$	129
11.4 Exponential Type Integrals Involving Logarithms	133
11.5 Numerical Examples	135
11.6 Errata	139
12. Conversion of a Power Series into a Series of Chebyshev Polynomials of the First Kind	154
13. Rational Approximations for ${}_2F_1(a,b;c;-z)$	159

14. Padé Approximations for ${}_2F_1(1,b;c;-z)$	174
15. Rational Approximations for ${}_1F_1(a;c;-z)$	182
16. Padé Approximations for ${}_1F_1(1;c;-z)$	192
17. Rational Approximations for Bessel Functions of the First Kind	203
18. Padé Approximations for $I_{\nu+1}(z)/I_{\nu}(z)$	220
19. Evaluation of Bessel Functions of the First Kind by Use of the Backward Recurrence Formula	230
19.1 Introduction	230
19.2 Backward Recurrence Schemata for $I_{\nu}(z)$ and $J_{\nu}(z)$	230
19.3 Numerical Examples	240
19.4 Mathematical Description of Programs	243
19.4.1 Evaluation of Functions Related to $I_{m+\nu}(z)$ and $J_{m+\nu}(z)$	243
19.4.2 Evaluation of Functions Related to $e^{-z}I_{m+\nu}(z)$	245
20. Rational Approximations for $z^a U(a;1+a-b;z)$	252
21. Padé Approximations for $zU(1;2-b;z)$	265
Appendices	
<i>Bibliography</i>	280
<i>Notation Index</i>	281
<i>Subject Index</i>	283