

A USER'S GUIDE TO FORTRAN PROGRAMS FOR WIGNER AND RACAH COEFFICIENTS OF SU_3 *

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PROGRAM SUMMARY

Title of program: SU3 WIGNER & RACAH COEFFICIENTS

Catalogue number: ACRM

Computer: IBM 360/67; *Installation:* The University of Michigan, Ann Arbor, Michigan, USA

Operating system: MTS/360

Programming language used: FORTRAN IV

High speed storage required: $SU_3 \supset SU_2 \times U_1$ Wigner coefficients, 13 008 words

SU_3 Racah coefficients, 14 654 words;

$SU_3 \supset R_3$ Wigner coefficients, 14 202 words

SU_3 Racah coefficients, 14 654 words. $SU_3 \supset R_3$ Wigner coefficients, 14 202 words

No. of bits in a word: 32

Is the program overlaid? No.

No. of magnetic tapes required: None.

Other peripherals used: Card reader, line printer

No. of cards in combined program and test deck: 2046

Keywords: SU_3 , Wigner coefficient, Racah coefficient, Clebsch–Gordan coefficient, Recoupling coefficient, Isoscalar factor, U-function, Unitary coupling, Unitary recoupling, K-band projection, Hypercharge.

Nature of physical problem

$SU_3 \supset SU_2 \times U_1$ and $SU_3 \supset R_3$ Wigner coefficients as well as SU_3 Racah coefficients are calculated for arbitrary couplings and multiplicity.

Method of solution

A build-up process based on the Biedenharn–Louck prescription for specifying the outer multiplicity is employed to generate $SU_3 \supset SU_2 \times U_1$ Wigner coefficients [1]. SU_3 Racah coefficients follow through standard recoupling formulae [2]. $SU_3 \supset R_3$ Wigner coefficients are obtained from the corresponding $SU_3 \supset SU_2 \times U_1$ Wigner coefficients via unitary transformation coefficients relating $SU_3 \supset SU_2 \times U_1$ and $SU_3 \supset R_3$ basis states [3].

Restrictions on the complexity of the problem

Factorials $M!$, $M \leq M_{\max} = 32$, and binomial coefficients $\binom{N}{M}$, $M \leq N \leq N_{\max} = 32$, are stored in common. Typically for $SU_3 \supset SU_2 \times U_1$ Wigner coefficients $\Lambda_1 + \Lambda_2 + \Lambda_3 \leq M_{\max}$ whereas for $SU_3 \supset R_3$ Wigner coefficients $\lambda + \mu + L \leq N_{\max}$. The limits M_{\max} and N_{\max} may be altered by modifying one and only one subprogram.

References

- [1] J.P. Draayer and Yoshimi Akiyama *J. Math. Phys.*, in press.
- [2] K.T. Hecht, *Nuclear Physics* 62 (1965) 1.
- [3] J.P. Draayer, *Nuclear Physics* A129 (1969) 647.

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