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Autore	Louck James D
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Schur Function Real Orthogonal Irreducible Representations; 4.4.2 Jucys-Murphy Real Orthogonal Representations; 4.5 Left and Right Regular Representations of Finite Groups; 5 Doubly Stochastic Matrices in Angular Momentum Theory; 5.1 Introduction; 5.2 Abstractions and Interpretations; 5.3 Permutation Matrices as Doubly Stochastic; 5.4 The Doubly Stochastic Matrix for a Single System with Angular Momentum J ; 5.4.1 Spin-1/2 System; 5.4.2 Angular Momentum- j System 5.5 Doubly Stochastic Matrices for Composite Angular Momentum Systems 5.5.1 Pair of Spin-1/2 Systems; 5.5.2 Pair of Spin-1/2 Systems as a Composite System; 5.6 Binary Coupling of Angular Momenta; 5.6.1 Complete Sets of Commuting Hermitian Observables; 5.6.2 Domain of Definition $RT(j)$; 5.6.3 Binary Bracketings, Shapes, and Binary Trees; 5.7 State Vectors: Uncoupled and Coupled; 5.8 General Binary Tree Couplings and Doubly Stochastic Matrices; 5.8.1 Overview; 5.8.2 Uncoupled States; 5.8.3 Generalized WCG Coefficients; 5.8.4 Binary Tree Coupled State Vectors 5.8.5 Racah Sum-Rule and Biedenharn-Elliott Identity as Transition Probability Amplitude Relations 5.8.6 Symmetries of the 6 - j and 9 - j Coefficients; 5.8.7 General Binary Tree Shape Transformations; 5.8.8 Summary; 5.8.9 Expansion of Doubly Stochastic Matrices into Permutation Matrices; 6 Magic Squares; 6.1 Review; 6.2 Magic Squares and Addition of Angular Momenta; 6.3 Rational Generating Function of $H_n(r)$; 7 Alternating Sign Matrices; 7.1 Introduction; 7.2 Standard Gelfand-Tsetlin Patterns; 7.2.1 A-Matrix Arrays; 7.2.2 Strict Gelfand-Tsetlin Patterns 7.3 Strict Gelfand-Tsetlin Patterns for $= (n \ n \ . \ 1 \ \cdot \cdot \cdot \ 2 \ 1)$

Sommario/riassunto

This monograph is a synthesis of the theory of the pairwise coupling of the angular momenta of arbitrarily many independent systems to the total angular momentum in which the universal role of doubly stochastic matrices and their quantum-mechanical probabilistic interpretation is a major theme. A uniform viewpoint is presented based on the structure of binary trees. This includes a systematic method for the evaluation of all $3n-j$ coefficients and their relationship to cubic graphs. A number of topical subjects that emerge naturally are also developed, such as the algebra of permutation matrices
