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An analytically solvable model to test the hyperspherical Sturmian approach for break up processes GUSTAVO GASANEO, Universidad Nacional del Sur, Bahia Blanca, Argentina, DARIO MITNIK, Universidad de Buenos Aires, Argentina, LORENZO UGO ANCARANI, Universite Paul Verlaine - Metz, France, FLAVIO COLAVECCHIA, ANA LAURA FRAPICCINI, JUAN MARTIN RANDAZZO, Centro Atomico Bariloche, Argentina — A spectral method to study the dynamics of a three-body collision break up process is presented. By expressing the wave function of the system as a sum of a scattered wave function and a known initial state, a non-homogeneous Schrodinger equation is derived. The scattering term is expanded with a basis of Sturmian functions. Two types of basis sets are used: (i) product of functions of the interparticle coordinates and (ii) product of hyperspherical Sturmians functions. Both basis sets explicitly include continuum asymptotic boundary conditions, and are the eigenvectors of a two-body problem where the magnitude of a potential is taken as the eigenvalue. The efficiency of the method is tested by applying the Sturmian approach to the study of simple fragmentation problems. We have constructed a solvable problem in hyperspherical coordinates, for which analytic expressions for the wave function as well as the transition amplitude are derived. We show that our numerical approach converges and is in excellent agreement with analytical results.

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