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Two-body Coulomb problems with sources LORENZO UGO ANCARANI, Universite Paul Verlaine- Metz, France, GUSTAVO GASANEO, Universidad Nacional del Sur, Bahia Blanca, Argentina — Within the time-independent approach, collisional processes can be associated to an initial condition corresponding to the solution of a simplified Hamiltonian where some of the interactions of the full Hamiltonian are neglected. The wave function satisfying the full Schrodinger equation can then be written as the sum of the solution of the simplified problem and the scattering solution. This separation leads straightforwardly to a non-homogeneous equation where the source is the product of the neglected interactions and the asymptotic solution. We deal here with non-homogeneous two-body Schrodinger equations containing a Coulomb interaction, with different types of non-homogeneities. This is an important problem which has been considered in connection with, e.g., the J-matrix approach [1]. In some cases, closed form solutions can be found and expressed in terms of a generalized hypergeometric function in two variables [2]. A detailed analysis allows us to investigate solutions having incoming, outgoing and standing wave asymptotic conditions.

[1] H. A. Yamani and W. P. Reinhardt, Phys. Rev. A 11, 1144 (1975).
[2] L. U. Ancarani and G. Gasaneo, J. Math. Phys. 49, 063508 (2008).

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