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Optimal pulse sequences for population transfer in the three level lambda system PRAVEEN KUMAR, VLADIMIR MALINOVSKY, SVETLANA MALINOVSKAYA, Stevens Institute of Technology, Hoboken — By means of the fields designed using optimal control theory, we study the dynamics of adiabatic population transfer and maximal coherence in a three-level lambda system. A family of solutions of the optimal pulse sequences is obtained using different numerical methods such as conjugate gradient method, Krotov method, and Zhu-Rabitz's iterative method. The minimum population transfer to the intermediate level is achieved via a functional constraint which depends on the state of the system at each instant of time. Optimal pulse sequences obtained is the well known STIRAP (stimulated Raman adiabatic passage) scheme for the complete population transfer and half-STIRAP method which only transfers half of the population between appropriate levels. We analyze the convergence properties of all the methods and demonstrate that the result of the Krotov method depends strongly on the choices of the reference field.

Praveen Kumar
Stevens Institute of Technology, Hoboken

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