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Complete Population Transfer in 4-Level System Via SU(2)×SU(2)/Z_2 Coupling DMITRY USKOV, Tulane University, HAIM SUCHOWSKI, Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot 76100, Israel — We describe a scheme for complete population transfer in a four-level system and identify its relation with the generating function of Pythagorean triples from number theory. In a simple case of the nearest-neighbor coupling the complete population transfer occurs if ratios between the coupling coefficients V_{12} ,V_{23} and V_{34} match one of the Pythagorean triples. We find that both the structure of the evolution operator and the period of complete population transfer are determined by two frequencies, associated with two distinct SU(2) subgroups of the full SU(4) dynamical group. We demonstrate that our solution can be interpreted as a generalization of the two-level Rabi solution for a four-level system.

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