

## DISCRETE 2012 - Third Symposium on Prospects in the Physics of Discrete Symmetries



Contribution ID: 34

Type: **not specified**

### THREE NEUTRINO OSCILLATIONS IN THE EARTH: AN ANALYTIC TREATMENT

*Thursday, 6 December 2012 18:15 (25 minutes)*

We use the Magnus expansion of the evolution operator in the adiabatic basis to find an approximate solution to the problem of three-neutrino oscillations in a medium with a symmetric, but otherwise arbitrary, density profile. We use an expression of the evolution operator for the neutrino system written as the product of three factors, each of them corresponding to an effective two-neutrino problem for a low or a high energy regime. By virtue of this factorization our approximation works well over a wide range of energies. When applied to the case of atmospheric neutrinos traversing the Earth, the oscillation probabilities thus calculated show good agreement with numerical results.

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**Session Classification:** P15 –NEUTRINOS