

8th International Conference on Symmetries and Integrability of Difference
Equations (SIDE8) **June 22–28, 2008**
8^e Conférence internationale “Symétrie et intégrabilité des équations aux
différences” (SIDE8) **22–28 juin, 2008**

Perturbative symmetry approach for differential-difference equations

Vladimir Novikov

Department of mathematics
Loughborough University
Loughborough, Leicestershire LE11 3TU
UNITED KINGDOM

V.Novikov@lboro.ac.uk

Abstract

We derive the perturbative version of the symmetry approach in the symbolic representation for differential-difference equations. This formalism combines the ideas of the symmetry approach of Shabat, Yamilov et al for the differential-difference equations and the perturbation theory of Zakharov, Schulman et al. This theory provides a powerful method of testing the integrability of differential-difference equations as well as suitable for classification of integrable equations. The theory is applicable to a large class of polynomial differential-difference equations as well as to non-local (quasi-local) equations.