INTRODUCTION TO GENERALIZED CLASSICAL AND QUANTUM SIGNAL AND SYSTEM THEORIES ON GROUPS AND HYPERGROUPS

Valeriy Labunets
Urals State Tecnical University
Ekaterinburg, Russia
lab@rtf.ustu.ru

"Look," they say, "here is something new!" But no, it has all happened before, long before we have were born.

—Good News Bible, Eccl.1:10

Abstract In this paper we develop two topics in parallel and show their inter- and crossrelation. The first centers on general notions of the classical signal/system theory on finite Abelian hypergroups. The second concerns the quantum hyperharmonic analysis of quantum signals (Hermitean operators associated with classical signals). We study classical and quantum generalized convolution hypergroup algebras of classical and quantum signals.

Keywords: classical and quantum signals/systems, classical and quantum Fourier transforms, Clifford algebra, hypergroups.