Discrete Dirac operators and harmonic analysis

Uwe Kähler
Department of Mathematics, University of Aveiro, PORTUGAL
ukaehler@ua.pt

In recent years one can observe an increasing interest in obtaining discrete counterparts for various continuous structures, especially a discrete equivalent to continuous function theory. This is not only driven by the idea of creating numerical algorithms for different continuous methods of studying partial differential equations, but also for true discrete purposes, as can be seen, among others, by recent results of S. Smirnov in connecting complex discrete function theory with problems in probability and statistical physics. While such ideas are very much developed in the complex case the higher-dimensional case is yet underdeveloped. This is mainly due to the fact that while discrete complex analysis is under (more or less) continuous development since the 1940's higher-dimensinal discrete analysis started effectively only in the eighties and nineties with the construction of discrete Dirac operators either for numerical methods of partial differential equations or for problems in physics. The development of Discrete Clifford analysis as being a discrete counterpart to classic Clifford analysis only started quite recently. In this talk we would like to discuss the possibility to use methods from harmonic analysis, particularly phase-space analysis to construct discrete function theories in higher dimensions.

.....