Two applications of multiparameter martingale approximation

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For a class of random fields we show how the solvability of a higher analogue of the Poisson equation implies a kind of martingale/coboundary representation. The latter can be used, like in the one-parameter setting, to reduce the central limit problem to the case of multiparameter martingale differences. Two specializations of this general scheme will be briefly sketched.

In one of them, developed in collaboration with Michel Weber, we consider an alternative approach to a problem in metric number theory treated before by means of different methods (see K. Fukuyama, B. Petit. Le théorème limite central pour les suites de R. C. Baker. Ergod. Th. Dyn. Syst., **21** (2001), 2, 479–492).

Another application, in a joint work with Herold Dehling and Manfred Denker, concerns limit theorems for V- and U- statistics related to a class of measure preserving transformations.