# English summaries

**Carles Barceló i Vidal**

*From compostional data to an Euclidean geometry on the simplex*

The reflection on the nature of *compositional data* and on the specific statistical methodology for the analysis of this type of data leads to the construction of the *space of compositions*, which is structured as an Euclidean vector space, with the simplex as support space. Some of the most characteristic elements of this geometry are illustrated on ternary diagrams.

Keywords: compositional data, compositional space, perturbation, simplex.

MSC2010 Subject Classification: 51M05, 62-07.

**Joan Gimbert**

*The mathematics of Google: The PageRank algorithm*

In this paper we present and analyze the PageRank algorithm, used by Google to rank its search results. We focus on the mathematical background of this algorithm, which involves nonnegative matrices, graphs and Markov chains. There are some other web ranking algorithms, based on the computation of eigenvectors, like the HITS algorithm, which we briefly explain at the end of the paper.

Keywords: PageRank algorithm, nonnegative matrices, graphs, Markov chains, HITS algorithm.

MSC2010 Subject Classification: 05C50, 15A51, 60J10.

**Jordi Marzo**

*How to distribute points uniformly on spheres?*

The Whittaker-Kotel'nikov-Shannon theorem allows us to recover, in a stable way, a bandlimited function of finite energy by using only its values on the integers. Hence, the integers give an example of a set of stable sampling which is evenly distributed on the real line. In this paper, we consider the relation between the existence of evenly distributed sets of points and sets of stable sampling in various settings (the real line, the circle and the sphere).

Keywords: sampling sequences, Marcinkiewicz-Zygmund inequalities, spherical harmonics, Fekete points.

MSC2010 Subject Classification: 65D32, 33C55, 65T40, 11K36.

**Ignasi Mundet i Riera**

*Colorful arithmetic sequences*

This is a survey on different results regarding finite arithmetic sequences of natural numbers. In the first part of the paper we discuss and prove Van der Waerden's theorem on arithmetic sequences. In the second part, which only contains proofs of elementary facts, we discuss Szemerédi's solution to Erdős–Turán conjecture and Green-Tao's theorem on arithmetic sequences of prime numbers.

Keywords: Van der Waerden's theorem, Szemerédi's theorem, Green and Tao's theorem.

MSC2010 Subject Classification: 11B75.