1044-54-97   **Ziqin Feng*** (`zif1@pitt.edu`), Department of Mathematics, Thackeray Hall 301, University of Pittsburgh, Pittsburgh, PA 15260. *Minimal Size of Basic Families.*

A family Phi of continuous real-valued functions on a space X is basic iff every map f:X to R can be represented as a finite sum f = (g$_1$ o phi$_1$) + ... +(g$_n$ o phi$_n$) for some phi$_i$ in Phi and maps g$_i$:R to R.

In his famous solution of Hilbert's 13th Problem, Kolmogorov proved that every compact metric finite dimensional space has a _finite_ basic family.

Define a cardinal invariant of a space X by: basic(X) = min —Phi— : Phi is a basic family for X .

Answering questions of Kolmogorov and others we have determined exactly which Tychonoff spaces have a basic finite family:

Theorem: The following are equivalent: i) X has basic(X) finite, ii) X has basic(X) countable, iii) X is locally compact, separable metrizable and finite dimensional.

More recently we have been calculating basic(X) for compact spaces. The answers have intriguing connections with Shelah's PCF theory. (Received August 25, 2008)