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Ramsey property with respect to filters

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RAMSEY PROPERTY WITH RESPECT TO FILTERS

by

Alain LOUVEAU

The purpose of this paper is the direct proof (by topological methods) of some combinatoric theorems due to Silver and Mathias.

If X is a subset of N we denote $\mathcal{P}(X)$, $\mathcal{P}_\infty(X)$ and $\mathcal{P}_f(X)$ the set of all subsets, of all infinite subsets and of all finite subsets respectively. $\mathcal{T}$ denotes the product topology on $\mathcal{P}(N)$.

Silver's theorem asserts: If $\mathfrak{X} \subset \mathcal{P}_\infty(N)$ is analytic with respect to $\mathcal{T}$ then $\mathfrak{X}$ is Ramsey. Studying the connection between such problems and selective ultrafilters Mathias improved this result in such a way: If $\mathcal{F}$ is selective ultrafilter then every analytic $\mathfrak{X}$ is $\mathcal{F}$-Ramsey. These combinatoric results are obtained by methods of logic, particularly of forcing.

On the contrary our methods use topologies on $\mathcal{P}(N)$ adopted to problems under consideration and permit us to obtain a characterization of some $\mathcal{F}$-Ramsey sets by terms of these topologies.

References:

A. Louveau: Une démonstration topologique de théorèmes de Silver et Mathias, Bull. Sc. Math. 2[e] série 98(1974), 97-102.

Another paper extending these results will appear in the Israel Journal of Mathematics.