

- DOMINIQUE LECOMTE, *Borel colorings and related problems.*

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The analytic graphs of countable Borel chromatic number have been characterized by Kechris, Solecki and Todorcevic, who found a minimum counter-example  $G_0$  and proved the following dichotomy result: an analytic relation on a Polish space has either a countable Borel coloring, or there is a continuous homomorphism from  $G_0$  into it. When the relation is Borel and admits a countable Borel coloring, we can ask about the relation between the Borel rank of the relation and that of the coloring. This motivates the study of countable colorings of a given Borel level. In particular, we study the Baire class one countable colorings, i.e., the countable partitions into  $F_\sigma$  sets. Such a partition gives a covering of the diagonal into countably many  $F_\sigma$  squares. This leads to the study of countable unions of  $F_\sigma$  rectangles. We give a Hurewicz-like dichotomy for such countable unions.