Texas Tech University. Analysis Seminars.

Extremal partitioning of the plane and space. Part I.

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Monday, January 30, 2017
Room: MATH 010. Time: 4:00pm.

ABSTRACT. I will discuss the problem of partitioning of the plane and three dimensional space into a system of non-overlapping condensers. Main question here is how to find systems of condensers which minimize certain energy functionals. Equivalently, this problem can be stated as follows: Identify all systems $\{D_1, \dots, D_n\}$ of non-overlapping ring domains which provide the maximal value for the weighted sum of their moduli $\sum \alpha_k^2 \mathrm{mod}(D_k)$ under certain topological assumptions.

In the two-dimensional case the solution of this problem is known for a long time and is given in terms of quadratic differentials. As concerns three-dimensional space, very little is known about geometry of possible extremal configurations and analytic properties of the weighted sums of moduli.