Energies on Deformed Planar Lattices: Geometric Consideration

Gaydarov, Stefan (School: Model High School of Mathematics "Akademik Kiril Popov")

The discovery of graphenes and fullerenes sparked a surge of interest in the understanding of their structures and properties. One approach, proposed by Friedrich, Seitz and Stefanelli stems from geometrical considerations with elements of potential theory, or as they present it - molecular mechanics. Our motivation is similar to that of Friedrich, Seitz and Stefanelli, but in some sense, inversed. We want to know what kind of constraints will generate certain "nice" geometrical configurations and whether the original constraints can be somewhat relaxed and altered. We alter their approach to energy by introducing an external field instead of the area element and study what constraints for the functions can yield certain geometrically "nice" configurations. We also consider relaxing some of the conditions of Friedrich, Seitz and Stefanelli and what changes that will introduce in the geometry of optimal configurations.

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