IPM

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Tangles and Mona Lisa
From graphs minors to cluster analysis

Abstract: Tangles, first introduced by Robertson and Seymour in their work on graph minors, are a radically new way to define regions of high connectivity in a graph. The idea is that, whatever that highly connected region might `be', low-order separations of the graph cannot cut through it, and so it will orient them: towards the side of the separation on which it lies. A tangle, thus, is simply a consistent way of orienting all the low-order separations in a graph.

The new paradigm this brings to connectivity theory is that such consistent orientations of all the low-order separations may, in themselves, be thought of as highly connected regions: rather than asking exactly which vertices or edges belong to such a region, we only ask where it is, collecting pointers to it from all sides.

Pixellated images share this property: we cannot tell exactly which pixels belong to the Mona Lisa's nose, rather than her cheek, but we can identify `low-order' separations of the picture that do not cut right through such features, and which can therefore be used collectively to delineate them.

These two talks will outline a general theory of tangles that applies not only to graphs and matroids but to a broad range of discrete structures. Including, perhaps, the pixellated Mona Lisa.

Monday, October 9, 2017 (17 Mehr 1396), 11:00-12:00
Tuesday, October 10, 2017 (18 Mehr 1396), 11:00-12:00
Lecture Hall 1, Niavaran Building, IPM