Polynomial methods in graph list coloring

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In 1994, C. Thomassen famously proved that every planar graph is 5-choosable, that is, if we assign a list of 5 possible colors to every vertex of a planar graph G, then we can properly color G using only colors from respective list for every vertex, regardless of how we chose those lists. In 2017, X. Zhu, using Alon's combinatorial counterpart for famous Hilbert's Nullstellensatz, came up with slight strengthening of Thomassen's result by means of certain graph polynomials, thus opening up a broad field for research. In this talk I will present an overview of those "polynomial methods", and some of the results that followed Zhu's discovery.

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