

On two generalizations of the Alon–Tarsi polynomial method

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In a seminal paper, Alon and Tarsi have introduced an algebraic technique for proving upper bounds on the choice number of graphs (and thus, in particular, upper bounds on their chromatic number). The upper bound on the choice number of G obtained via their method, was later coined the Alon–Tarsi number of G and was denoted by $AT(G)$. They have provided a combinatorial interpretation of this parameter in terms of the eulerian sub-digraphs of an appropriate orientation of G . Shortly afterwards, for the special case of line graphs of d -regular d -edge-colorable graphs, Alon gave another interpretation of $AT(G)$, this time in terms of the signed d -colorings of the line graph.

In the talk I will generalize both results. I will then use these results to prove some choosability results. In the first part of the talk I will introduce chromatic, choice, and Alon-Tarsi numbers of graphs. In the second part I will state the two generalizations as well as some applications.