Degree powers in graphs with a forbidden forest

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For a graph G with degree sequence $d_1, \ldots, d_n$, and a positive integer p, let $e_p(G) = d_1^p + \cdots + d_n^p$. In 2000, Caro and Yuster [A Turán type problem concerning the powers of the degrees of a graph, Electron. J. Combin. 7 (2000), R47] introduced the following Turán type problem: Given a positive integer p and a graph H, determine the function $\mathrm{ex}_p(n, H)$, which is the maximum value of $e_p(G)$ taken over all graphs G on n vertices that do not contain H as a subgraph. Obviously, we have $\mathrm{ex}_1(n, H) = 2\,\mathrm{ex}(n, H)$, where $\mathrm{ex}(n, H)$ denotes the classical Turán function. Previous results on this problem, obtained by various authors, include the determination of the function $\mathrm{ex}_p(n, H)$ when H is a complete graph, a cycle, a path, and a star. In this talk, we shall present some new results for the function $\mathrm{ex}_p(n, H)$ when H is a certain type of forest, namely, a linear forest, a star forest, and a broom (i.e., a path with a star at one end). Joint work with Yongxin Lan (Nankai University), Zhongmei Qin (Chang'an University), and Yongtang Shi (Nankai University).

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