Extremal problems for weighted Szeged index

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An extension of the well-known Szeged index, named as *weighted Szeged index (wSz(G))*, was recently introduced. The talk will be devoted to characterizing the extremal trees and graphs of this new topological invariant. In particular, we prove that the star is a tree having the maximal wSz(G). On the other hand, finding a tree with the minimal wSz(G) seems to be more challenging. Here, we present the minimal trees up to 25 vertices obtained by computer and describe the regularities which retain in them. Our preliminary computer tests suggest that a tree with the minimal wSz(G) is also the connected graph of the given order that attains the minimal weighted Szeged index. Additionally, we show that among the bipartite connected graphs the complete balanced bipartite graph $K_{\lfloor n/2 \rfloor \lceil n/2 \rceil}$ attains the maximal wSz(G). I will also briefly discuss recent progress on these questions and connections to existing topological indices.

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