List Chromatic Number and Energy of Graphs

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The energy of a graph G is defined as the sum of the absolute values of all eigenvalues of G and denoted by $E(G)$. We show that apart from a few families of graphs, $E(G) \geq 2 \max\left(\chi_\ell(G), n - \chi(\overline{G})\right)$, where $\overline{G}$, $\chi(G)$, and $\chi_\ell(G)$ are the complement, the chromatic number, and the list chromatic number of G, respectively.