Wiener index of iterated line graphs of trees

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Let $G$ be a graph. The Wiener index of $G$, $W(G)$, is defined as the sum of distances between all pairs of vertices of $G$. Denote by $L^i(G)$ its $i$-iterated line graph. In the talk, we will consider the equation $W(L^i(T)) = W(T)$ where $T$ is a tree and $i \geq 1$. 