An $(8/5+\varepsilon)$-approximation for minimum two-edge-connectivity augmentations of trees

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We consider the following problem: given a ground set V, a tree $T = (V, \mathcal{E})$, and an additional edge set E disjoint from $\mathcal{E}$, find a minimum size set of edges $F \subseteq E$ such that $(V, \mathcal{E} \cup F)$ is 2-edge connected. This problem is NP-hard. For a long time 2 was the best approximation ratio known. Recently, Nagamochi derived a $(1.875 + \varepsilon)$-approximation algorithm. We give a new algorithm with a better approximation ratio of $(1.6 + \varepsilon)$, and a simpler analysis.