

Online interval coloring on short interval graphs and two-count interval graphs

Israel R. Curbelo, Kean University

We study the online coloring of σ -interval graphs which are interval graphs where the interval lengths are in $[1, \sigma]$ and 2-count interval graphs which are interval graphs that require at most 2 interval lengths.

For online σ -interval graph coloring, we focus on online algorithms that do not have knowledge of the interval representation. The Kierstead-Trotter algorithm has competitive ratio 3 for all σ and no online algorithm has competitive ratio better than 2, even for $\sigma = 1$. We show that for every $\epsilon > 0$, there is a $\sigma > 1$ such that there is no online algorithm for σ -interval coloring with competitive ratio less than $3 - \epsilon$. Our strategy also improves the best known lower bounds for the greedy algorithm First-Fit for many values of σ .

For online 2-count interval graph coloring, we analyze the performance of First-Fit and algorithms under various scenarios. We consider algorithms that receive the interval representation as input and algorithms that do not. We also consider algorithms that have prior knowledge of the interval lengths and algorithms that do not. We provide non-trivial lower bounds for each of the four cases.

Keywords: online algorithms, graph coloring, interval graphs