FPT Approximations for Fair k-Min-Sum-Radii

Mattis Gerteis
Heinrich-Heine-Universität Düsseldorf

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Guessing Radii from a given (fair) k-center solution

Algorithm 1 Guessing radii

Input: radii of k-center solution $R_{initial}$, approximation factor β, k, ϵ
Output: set R of $O(log^k_{1+\epsilon}(\frac{k}{\epsilon}))$ radius profiles

```
R = ∅
r*_1 = max(R_initial)
j = 1
// find initial candidates for the largest radius and initialize their profiles as sets
append R_1 := {(1 + ϵ)^(j−1) * r*_1/β} to R
while j < log_{1+ϵ}(βk) and element of last set added < k r*_1 do
    append R_{j+1} := {(1 + ϵ)^j * r*_1/β} to R
    j++
append R_{j+1} := {k r*_1} to R
// each profile is then appended with its own possible sub intervals
for R_j in R do
    j = 2
    lb = ϵ/k * R_j[0]
    while j ≤ log_{1+ϵ}(k/ϵ) and last element of R_j ≤ R_j[0] do
        append (1 + ϵ)^j * lb to R_j
        j++
    move first element of R_j to the end of R_j
return R
```