

TSP

$$P \in \left[\frac{1}{2}, \frac{3}{4}\right]^2$$

$$\text{diam}(P) \geq \frac{1}{4}$$

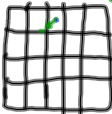
$$\text{TSP}(P) \leq n \cdot \frac{1}{2}$$

$\Downarrow$

$r = 2^{\lceil \log \frac{n}{\epsilon} \rceil}$

$2 \cdot \sqrt{2} \cdot r \cdot \eta < \frac{\epsilon}{4} \leq \epsilon \cdot \text{TSP}$

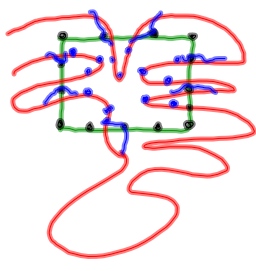
G_r



$p \rightarrow G_r(p) \leftarrow \text{spread } O\left(\frac{n}{r^2}\right) = O(n^3)$

$x \in [0, \frac{1}{2}]^2 \quad \text{QT}(G_r(p), x)$

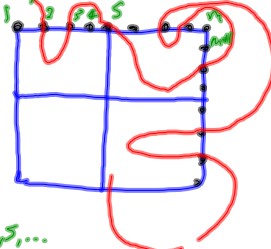
aug 19-12:46



$m = O\left(\frac{\log n}{\epsilon}\right)$

$K = O(1/\epsilon)$

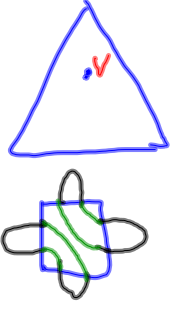
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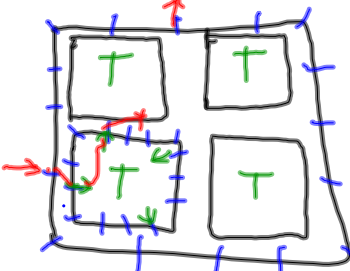
$2, 3, 5, \dots$

$T = m \cdot m! = m^m$

$T = m^{O(n)} = O\left(\left(\frac{\log n}{\epsilon}\right)^{O(1/\epsilon)}\right)$



aug 19-14:25



$O(T^4) \cdot O(T^{O(n)})$

$T^{O(1)}$

$= O(\log n)^{O(\log n)}$

$O(n \log n T^{O(n)})$

$O\left(\frac{1}{\epsilon}\right)$

$n (\log n)^{O(\log n)}$

$n (\log n)^{O(1/\epsilon)}$

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Lemma

Π_{opt} - optimal tour

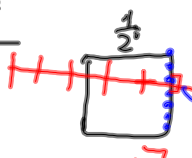
G_i = shifted grid of side $\frac{1}{2^i}$

$E[\text{total cost of snapping to portals}]$

$O\left(\frac{\|\Pi_{\text{opt}}\|}{m}\right)$

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Proof



$\frac{1}{2^i}$

$\frac{1/2^i}{m}$

price of snapping of TSP is $\frac{\|\Pi_{\text{opt}}\|}{m}$

$P[s \text{ intersects } G_i] \approx \frac{\|s\|}{1/2^i}$

$E[\text{times } s \text{ intersects } G_i] \approx \frac{\|s\|}{1/2^i}$

$E[\text{price of snapping of } s] = \|s\| \cdot 2^i \cdot \frac{1}{2^i m}$

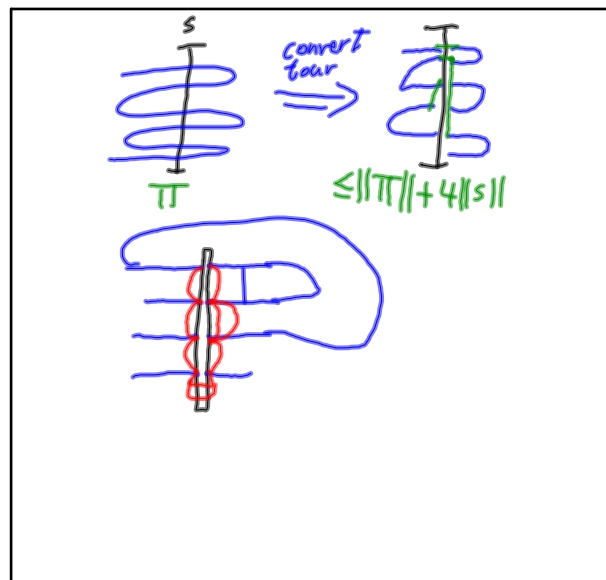
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Expected total cost of snapping

$$O\left(\frac{\|TSP_{opt}\|}{m}\right) \cdot O(\log n) \leq \varepsilon \frac{\|TSP_{opt}\|}{2}$$

$$m = O\left(\frac{\log n}{\varepsilon}\right)$$

aug 19-14:54



aug 19-14:56