

~~Lab~~ Now 1

## Perturbation trick

Idea: Add to the  $i$ th edge's cost an extra cost of

$$\frac{i}{2nm} \Rightarrow \textcircled{=} c_{e_i}' = c_{e_i} + \frac{i}{2nm}$$

$\nearrow$   
ith edge

Ex: All edge costs are distinct.

Q: How much can the MST cost change?

$\rightarrow$  In the worst case, the largest  $n-1$  cost edges are picked.

$\Rightarrow$  total perturbation in MST costs

$$= \frac{m}{2nm} + \frac{m-1}{2nm} + \dots + \frac{m-(n-2)}{2nm}$$

$$< (n-1) \frac{m}{2nm} < \frac{1}{2} \textcircled{=}$$