

# Simultaneous Geometric Embedding of a Path and a Tree

## 1 Question

Let  $P$  be a path and let  $T$  be a tree such that  $P$  and  $T$  have the same set of  $n$  vertices (i.e. there is a given mapping between the vertices of  $P$  and the vertices of  $T$ ). We ask whether there exists a set  $S$  of  $n$  points such that both  $P$  and  $T$  admit a straight-line planar drawing where the vertices are mapped to the points of  $S$ .

## 2 Observations

It is known that two paths can always be simultaneously embedded [1] while this is not possible in general for two trees [2].

## References

- [1] P. Brass, E. Cenek, A. Duncan, A. Efrat, C. Erten, D. Ismailescu, S. Kobourov, A. Lubiw, and J. Mitchell. On simultaneous planar graph embeddings. In *Proc. 8th Workshop on Algorithms and Data Structures (WADS 2003)*, Lecture Notes Comput. Sci., pages 243–255, 2003.
- [2] M. Geyer, M. Kaufmann, and I. Vrt'o. Two trees which are self-intersecting when drawn simultaneously. In *Proc. 13th International Symposium on Graph Drawing (GD 2005)*, volume 3843 of *Lecture Notes Comput. Sci.*, pages 201–210, 2005.