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*On stable paths*

Let  $G$  be a graph with a distinguished vertex  $d$ . Suppose that each vertex of  $G$  has a preference list of a set of paths joining it to  $d$ . A solution to the stable paths problem is a tree  $T$  in  $G$  rooted at  $d$ , with the property that for each vertex  $x$ , if  $x$  prefers some path  $P$  to the path from  $x$  to  $d$  in  $T$ , then some edge of  $P$  not incident to  $x$  is missing from  $T$ . Not every instance of the stable paths problem has a solution, but we show that every instance does have a fractional solution.