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Continuous surveillance of points by rotating floodlights

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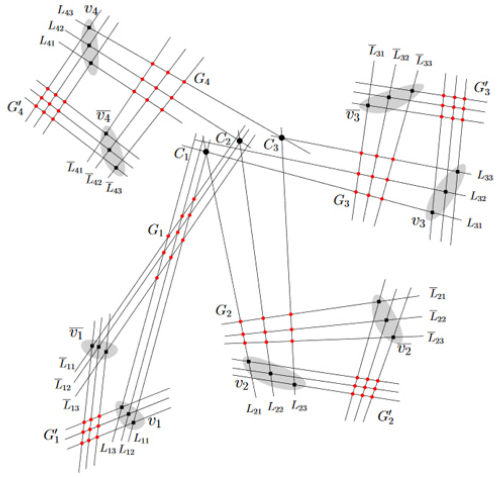

Let P and F be sets of n â‰¥ 2 and m â‰¥ 2 points in a plane, respectively. We study the problem of finding the minimum angle Î± Ïµ [2Î /m, 2Î] such that one can install at each point of F a stationary rotating floodlight with illumination angle Î±, initially oriented in a suitable direction, in such a way that, at all times, every target point of P is illuminated by at least one floodlight. All floodlights rotate clockwise at unit speed. We provide bounds for the case in which the elements of P â‹ F are on a given line, and present exact results for the case in the plane in which we have two floodlights and many target points. We further consider the non-rotating version of the problem and look for the minimum angle Î± such that one can install a non-rotating floodlight with illumination angle Î± at each point of F, in such a way that every target point of P is illuminated by at least one floodlight. We show that this problem is NP-hard and hard to approximate.

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