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The $T(5)$ property of families of overlapping unit disks

In this joint work with K. Böröczky and A. Heppes, we consider a finite family F of unit disks in the plane with the properties:

- $T(k)$: any k-element subfamily of F has a (line) transversal, and
- $O(d)$: the distance between the centres of any two elements of F is greater than d.

It is well known that F has a transversal in each of the following cases:

$$\begin{cases} k = 3 \text{ and } d > 2\sqrt{2} (\sharp) \\ k = 4 \text{ and } d > 4/\sqrt{3} (\sharp) \\ k = 5 \text{ and } d = 2 \text{ or } d > 2. \end{cases}$$

In this preliminary report, we present arguments that F has a transversal in the case that $k = 5$ and $d = \sqrt{3}$.