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The Beckman-Quarles theorem for mappings from $\mathbb{R}^2$ of $\mathbb{F}^2$, where $\mathbb{F}$ is a subfield of a commutative field extending $\mathbb{R}$. (English)

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The classical Beckman-Quarles theorem says that any unit-distance preserving mapping $f : \mathbb{R}^n \rightarrow \mathbb{R}^n$ ($n \geq 2$) is an isometry. In the same vein, the author investigates distance-preserving mappings from $\mathbb{R}^2$ to $\mathbb{F}^2$, where $\mathbb{F}$ is a subfield of a commutative field extension of $\mathbb{R}$. The main result asserts that every unit-distance preserving mapping $f : \mathbb{R}^2 \rightarrow \mathbb{F}^2$ has the form $I \circ (\rho, \rho)$, with $\rho : \mathbb{R} \rightarrow \mathbb{F}$ a field homomorphism and $I : \mathbb{F}^2 \rightarrow \mathbb{F}^2$ an affine mapping with orthogonal linear part.

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Classification :

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