

The 16th Hilbert problem for discontinuous piecewise isochronous centers of degree one or two separated by a straight line

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In this paper we deal with discontinuous piecewise differential systems formed by two differential systems separated by a straight line when these two differential systems are linear centers (which always are isochronous) or quadratic isochronous centers. It is known that there is a unique family of linear isochronous centers and four families of quadratic isochronous centers. Combining these five types of isochronous centers we obtain fifteen classes of discontinuous piecewise differential systems.

We provide upper bounds for the maximum number of limit cycles that these fifteen classes of discontinuous piecewise differential systems can exhibit, so we have solved the 16th Hilbert problem for such differential systems. Moreover in seven of the classes of these discontinuous piecewise differential systems the obtained upper bound on the maximum number of limit cycles is reached.

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