Global dynamics of Planar Quintic Quasi–homogeneous Polynomial Differential Systems

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In the qualitative theory of planar polynomial differential systems, there are lots of results on their topological structures. But there are only few class of planar polynomial differential systems whose globally topological phase portraits were completely characterized. We consider quasi–homogeneous polynomial differential systems for their global dynamics. Homogeneous systems are a class of special quasi–homogeneous systems. Many papers have characterized phase portraits of homogeneous polynomial vector fields. Recently, García *et al* [2] provided an algorithm to compute quasi–homogeneous but non–homogeneous polynomial differential systems with a given degree and obtained all the quadratic and cubic quasi–homogeneous but non–homogeneous vector fields. Aziz *et al* [1] characterized all cubic quasi–homogeneous polynomial differential equations which have a center. Liang *et al* [3] classified all quartic quasi–homogeneous but non–homogeneous differential systems, and obtained all their topological phase portraits. Until now the topological phase portraits of all quintic quasi–homogeneous but non–homogeneous differential systems have not been settled. We [4] first characterize all quasi–homogeneous but non–homogeneous planar polynomial differential systems of degree five, and then among which we classify all the ones having a center at the origin. Finally we characterize the global topological phase portraits of quintic quasi–homogeneous but non–homogeneous differential systems.

References

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