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Configurations of invariant lines of total multiplicity 7 of cubic systems with four real distinct infinite singularities

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Consider the family of planar cubic polynomial differential systems. Following [1] we call *configuration of invariant lines* of a cubic system the set of (complex) invariant straight lines (which may have real coefficients), including the line at infinity, of the system, each endowed with its own multiplicity and together with all the real singular points of this system located on these invariant straight lines, each one endowed with its own multiplicity.
Our main goal is to classify the family of cubic systems according to their geometric properties encoded in the configurations of invariant straight lines of total multiplicity seven (including the line at infinity with its own multiplicity), which these systems possess.
Here we consider only the subfamily of cubic systems with four real distinct infinite singularities which we denote by $\mathbf{CSL}_7^{4s\infty}$. We prove that there are exactly 94 distinct configurations of invariant straight lines for this class and present corresponding examples for the realization of each one of the detected configurations.
We remark that cubic systems with nine (the maximum number) of invariant lines for cubic systems are considered in [2], whereas cubic systems with eight invariant lines (considered with their multiplicities) are investigated in [3-7].

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