Limit cycles, invariant meridians and parallels for polynomial vector fields on the torus

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We study the polynomial vector fields of arbitrary degree in $\mathbb{R}^3$ having the 2–dimensional torus

$$\mathbb{T}^2 = \{(x, y, z) \in \mathbb{R}^3 : (x^2 + y^2 - a^2)^2 + z^2 = 1\} \text{ with } a > 1,$$

invariant by their flow.

We characterize all the possible configurations of invariant meridians and parallels that these vector fields can exhibit. Furthermore we analyze when these invariant either meridians or parallels can be limit cycles.

References

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