CONTINUOUS LINEAR AND QUADRATIC POLYNOMIAL DIFFERENTIAL SYSTEMS ON THE 2-DIMENSIONAL TORUS AND THE KLEIN BOTTLE

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We identify the 2-dimensional torus and the Klein bottle with the unit square with the corresponding identifications on its sides. We study the dynamics of the continuous linear and quadratic polynomial differential systems on these two surfaces. The linear systems depend on two parameters, while the quadratic ones depend on six parameters. In particular we characterize all the local phase portraits of their equilibrium points, we study their limit cycles,... Our final objective is to obtain the global phase portraits of these differential systems.