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During the past thirty years, strong relationships have interwoven the fields of dynamical systems, linear algebra and number theory. This rapport between different areas of mathematics has enabled the resolution of some important conjectures and has in fact given birth to new ones. This book sheds light on these relationships and their applications in an elementary setting, by showing that the study of curves on a surface can lead to orbits of a linear group or even to continued fraction expansions of real numbers.

Geodesic and Horocyclic Trajectories presents an introduction to the topological dynamics of two classical flows associated with surfaces of curvature -1, namely the geodesic and horocycle flows. Written primarily with the idea of highlighting, in a relatively elementary framework, the existence of gateways between some mathematical fields, and the advantages of using them, historical aspects of this field are not addressed and most of the references are reserved until the end of each chapter in the Comments section. Topics within the text cover geometry, and examples, of Fuchsian groups; topological dynamics of the geodesic flow; Schottky groups; the Lorentzian point of view and Trajectories and Diophantine approximations.

This book will appeal to those with a basic knowledge of differential geometry including graduate students and experts with a general interest in the area

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