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## **Study of nonhyperbolic measures in partially hyperbolic dynamics**

We consider step skew product whose base dynamics is the full shift  $n$  symbols ( $n \geq 2$ ) and the fiber dynamics is given by circle diffeomorphisms. One key property of those systems is the existence of fiber-contracting and -expanding regions which are mingled by the dynamics. This gives rise to the occurrence of nonhyperbolic (i.e., fiber Lyapunov exponent equal to zero) measures with positive entropy. The systems that we consider are motivated by the dynamics of nonhyperbolic robustly transitive diffeomorphisms. However, they also allow to study elliptic  $SL(2, \mathbb{R})$  cocycles. We study the entropy of ergodic nonhyperbolic measures and establish so-called restricted variational principles. Here we consider the topological entropy of the set of points with zero exponent. We discuss the construction of ergodic nonhyperbolic measures. For that we first introduce the method of periodic approximations by Gorodetski-Ilyashenko-Kleptsyn-Nalsky. We then present generalizations of this method in order to construct positive-entropy ergodic nonhyperbolic measures. This extension combines symbolic and orbitwise approaches. These lectures are based in a series of joint works with L. J. Díaz (PUC-Rio) and M. Rams (IM PAN).