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Another billiard problem

In the works of S.Y.Dobrokhotov with coauthors on the quasiclassical approximation for the degenerate wave equation there appeared the problem of studying the geodesic flow of a Riemannian metric which tends to infinity at the boundary of a domain. After regularization the problem is reduced to studying a degenerate Birkhoff-type billiard. We obtain a normal form of the regularized geodesic flow near the boundary and prove a version of Lazutkin's theorem for the corresponding billiard map. This is a joint work with D.V.Treschev.