

ABSTRACT. We show that if two closed hyperbolic surfaces (not necessarily orientable or even connected) have the same Laplace spectrum, then for every length they have the same number of orientation-preserving geodesics and the same number of orientation-reversing geodesics. Restricted to orientable surfaces, this result reduces to Huber's theorem of 1959. Appropriately generalized, it extends to hyperbolic 2-orbifolds (possibly disconnected). We give examples showing that it fails for disconnected flat 2-orbifolds.