Wiener Soccer and Its Generalization

Yuliy Baryshnikov, *University of Osnabrueck*

Abstract
The trajectory of the ball in a soccer game is modelled by the Brownian motion on a cylinder, subject to elastic reflections at the boundary points (as proposed in [KPY]). The score is then the number of windings of the trajectory around the cylinder. We consider a generalization of this model to higher genus, prove asymptotic normality of the score and derive the covariance matrix. Further, we investigate the inverse problem: to what extent the underlying geometry can be reconstructed from the asymptotic score.

Research Support Tool

Capture Cite
View Metadata
Printer Friendly

▼ Context

Author Address

▼ Action

Email Author
Email Others

Bibliography

1. Y. Colin de Verdiere, Reseaux electriques planaires I, Comm. Math. Helv., 69, 351-374 (1994) Math Review link
2. Ph. Griffiths, J. Harris, Principles of Algebraic Geometry, Wiley (1979). Math Review link
3. S. Kozlov, J. Pitman, M. Yor, Wiener football, Probab. Theory Appl., 40, 530-533 (1993). Math Review article not available.
4. T. J. Lyons, H. P. McKean, Winding of the plane brownian motion, Adv. Math., 51, 212-225 (1984). Math Review link
5. D. Mumford, Tata lectures on theta, II, Birkhauser, Boston, 1984. Math Review link
6. J. Pitman, M. Yor, Asymptotic laws of planar Brownian motion, Ann. Probab. 14, 733-779 (1986) and 17, 965-1011 (1989). Math Review link
7. H. Yanagihara, Stochastic determination of moduli of annular regions and tori, Ann. Probab. 14, 1404-1410 (1986). Math Review link