

Random Billiards

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By a random billiard we mean a billiard system in which the standard specular reflection rule is replaced with a Markov transition probabilities operator K that, at each collision of the billiard particle with the boundary of the billiard domain, gives the probability distribution of the post-collision velocity for a given pre-collision velocity.

Following the work of Dingle, Lamb and Lazaro-Cami [1] we show the convergence, almost certainly, of the distributions $\nu^{(n)}$ of the proportions of the particles that reach the edge of a test tube with an initial angle θ . The strategy is to make a deterministic representation of the random dynamics and prove its ergodicity (Exactness).

References

- [1] KAMALUDIN DINGLE, JEROEN S. W. LAMB AND JOAN-ANDREU LAZARO-CAMI , *Knudsen's law and random billiards in irrational triangles* , Nonlinearity 26 , 2012.
- [2] RENATO FERES , *Random Walks Derived from Billiards* , Mathematical Sciences Research Institute Publications vol 54. , 2007.