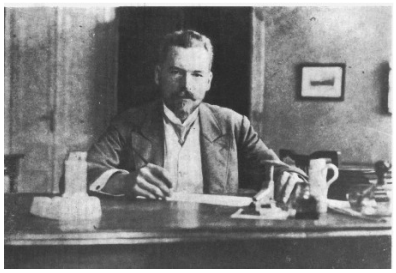

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Subdiffusion in a randomly inhomogeneous medium from a Fock Space Approach

Tuesday, 26 September 2023 16:40 (1 minute)

In this work we study the problem of a random walk
in a finite-size randomly inhomogeneous one-dimensional medium by using a Fock space approach.
We map the master equation of the walker into a Schr\"odinger-like equation
and we describe the evolution of the random walk in a Fock space in which the
system states are assigned to the sites of a regular one-dimensional lattice.
This formalism allows to evaluate the
probability $P(i,t)$ of finding
the walker in a given point i at a given time t.
Unlike previous applications of a Fock space for random walks displaying
anomalous diffusion \cite{nicolau_jpa,araujo_jsm}, here
we set in each point i of the domain
the probability $r_i \in [0,1]$ for the walker to stay
and the symmetric probabilities $(1-r_i)/2$ to jump on the left
or on the right, respectively, into the nearest neighbor site.
Moreover, probabilities r_i are assumed to be random and drawn
from a Beta distribution $B(a,b)$ in each i-site of the domain.
If $b<1$, then a crossover from standard to sub-diffusion is observed.
We show that the walker distribution converges
to a stretched-exponential in the case of subdiffusion and the
functional relation between the anomalous exponent and the
statistical features of r_i distributed according to $B(a,b)$
is also provided.

\begin{thebibliography}{99.}

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