A STRONG LAW OF LARGE NUMBERS FOR THE FRAGMENTATION ENERGY MODEL

ROBERT KNOBLOCH

In this talk we prove the almost sure convergence of a random functional that describes the energy cost needed in order to fragment blocks of unit mass to blocks of sizes less than $\eta \in (0, 1]$. The underlying stochastic process is a self-similar fragmentation process and the so-called cost function gives additional randomness to the model. Our approach is based on first devising a general strong law of large numbers for $(Z_\eta^\phi)_{\eta\in(0,1]}$, the process counted with a random characteristic ϕ. Then we show how the fragmentation energy model fits into this general setting and how the convergence result follows from it. Moreover, by considering the potential energy we show the almost sure convergence of random empirical measures associated with the stopping line that corresponds to the first blocks, in their respective "line of descent", of size less than $\eta \in (0, 1]$.

Fragmentation processes are closely related to Lévy processes and many techniques used to prove our results are based on the theory of Lévy processes.

References

[1] R. Knobloch. Asymptotic properties of the process counted with a random characteristic in the context of fragmentation processes, submitted, 2012, arXiv: 1203.4212