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Noisy patterns: Bridging the gap between stochastics and dynamics

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Stellingen behorende bij het proefschrift

Noisy Patterns

Bridging the Gap between Stochastics and Dynamics

geschreven door

Christian Hamster

1. In order to study the behaviour of stochastic travelling waves, it is essential to have a rigorous description of the phase of the wave. [Ch. 2-5]
2. The phase of the stochastic wave should be defined as the solution of a stochastic differential equation, not as the solution of a random differential equation, to gain a detailed description of the wave dynamics. [Ch. 2,4]
3. For bistable stochastic reaction-diffusion equations with multiplicative noise, an accurate description of the wave can be given for exponentially long timescales. [Ch. 5]
4. The application of modern dynamical systems theory to stochastic reaction-diffusion equations has shown to be very powerful. [Ch. 2-5]
5. In our field, equations often come from a more applied part of science. Therefore, we should make sure that our mathematical assumptions reflect the ‘real’ problem and they should not be altered for mathematical convenience.
6. Mathematical problem solving is often too slow to keep up with the applications, so we must, as a community, find a way to stay closer to the frontiers in other fields.
7. In the mathematical literature, old results often heavily depend on explicit computations, while modern results use more abstract considerations. It is important to not discard these old works as obsolete, but to keep them close, as they are invaluable for students new to the field.
8. In difficult times like ours, the need to have decent mathematical models on which to base policies has once more become clear.

9. There should be a ‘journal of mathematical folklore’, where mathematicians can submit papers, which were believed by the community to exist already for decades. This in order to prevent mathematicians to skip proofs by saying things like “Oh, well, that must be somewhere in Henry”.
10. When reviewing mathematical papers, Ben Orlin’s instructions on “How to use Facebook emoji to respond to a math proof” should be made mandatory.
11. In high school, extra training outside school hours like ‘examencursussen’ should only be available for those who need it, not for those whose parents can afford it.