

Synchronisation by noise and order preservation

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Abstract. Synchronisation by noise occurs when trajectories of a randomly perturbed system which evolves in time converge to each other. One example of interest is the stochastic quantisation of Euclidean quantum field theory given by the following SPDE,

$$\begin{cases} (\partial_t - \Delta)u = -u^3 + u + \sqrt{2}\xi \\ u|_{t=0} = f, \end{cases} \quad (\text{SQE})$$

where ξ is space-time white noise and f is some initial condition. Due to the low regularity of ξ , (SQE) is ill-posed in space-dimension $d \geq 2$, but there is a meaningful notion of solutions in dimensions $d = 2, 3$ after suitable renormalisation. In this talk I will revise some known results on synchronisation by noise for order preserving SPDEs and explain how these ideas can be generalised and used in combination with additional properties to prove uniform-in-the-initial-data synchronisation by noise for (SQE).

The talk is based on a joint work with Benjamin Gess.