SYNCHRONIZATION OF STOCHASTIC MASTER-SLAVE SYSTEMS

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We deal with abstract systems of two coupled nonlinear stochastic (infinite dimensional) equations subjected to additive white noise type process. This kind of systems may describe various interaction phenomena in a continuum random medium. Under suitable conditions we prove the existence of an exponentially attracting random invariant manifold for the coupled system and show that this system can be reduced to a single equation with modified nonlinearity. This result means that under some conditions we observe (nonlinear) synchronization phenomena in the coupled system. Our applications include stochastic systems consisting of (i) parabolic and hyperbolic equations, (ii) two hyperbolic equations, and (iii) Klein-Gordon and Schrödinger equations. We also show that the random manifold constructed converges to its deterministic counterpart, when the intensity of noise tends to zero.