

A stochastic Schauder-Tychonoff type theorem and its applications

E. Hausenblas^a, A. Kumar^a, and J. M. Tölle^b

^a Montanuniversität Leoben, Department Mathematik und Informationstechnologie, Franz Josef Straße 18,
8700 Leoben, Austria

^b Aalto University, Department of Mathematics and Systems Analysis, PO Box 11100 (Otakaari 1, Espoo)-
00076 Aalto, Finland.

One standard way to prove existence for deterministic, highly nonlinear PDEs is to use the Schauder–Tychonoff fixed-point theorem. In what follows, we introduce and verify a stochastic variant of the Schauder–Tychonoff theorem. We apply our existence result to nonlinear stochastic diffusion equations with non-Lipschitz perturbations.

References:

- [1] E. Hausenblas, A. Kumar and J. M. Tölle, A stochastic Schauder-Tychonoff type theorem and its applications, *Submitted*, (2026), <https://arxiv.org/pdf/2602.17285>.
- [2] E. Hausenblas and J. M. Tölle, The stochastic Klausmeier system and a stochastic Schauder-Tychonoff type theorem. *Potential Anal.*, 61(2):185–246, 2024.