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Enhanced Convergence and Robust Performance of Randomized Dynamical Decoupling LEA SANTOS, LORENZA VIOLA, Dartmouth College — Dynamical decoupling methods consist of repetitive sequences of control operations, whose net effect is to coherently modify the natural target dynamics to a desired one. In addition to standard deterministic schemes, randomized decoupling strategies have been recently introduced. Here, we exhibit clear evidence of the benefits of randomization in reducing the effects of undesirable couplings. For control systems which are either time-varying or require decoupling cycles involving a large number of operations, we find that simple randomized protocols offer superior convergence and stability as compared to high-level deterministic designs, including combinatorial and concatenated methods. We also show how significant improvements may be achieved for long interaction times by combining deterministic and stochastic features into new hybrid decoupling schemes.

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