Variational Principles on Nonlinear Responses and Path-Integral
Quantization of Dissipative Dynamics

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New variational principles of transport phenomena will be presented with an emphasis to nonlinear responses by introducing “integrated” entropy production. This scheme can be extended to the construction of the variational theory of dissipative dynamics. This yields the path-integral quantization of such dissipative systems. Several applications of these new theories will be given in electric conductions, thermal diffusion, particle diffusion and magnetic relaxation.