cases	doc_1	doc_2	decision	id
authors	• NÃ¼sken, Nikolas • Renger, D.R. Michiel	• NÃ¼sken, N. • Renger, M.	DUPLICATES	726
title	Stein Variational Gradient Descent:many-particle and long-time asymptotics	Stein Variational Gradient Descent:many-particle and long-time asymptotics		
publication_date	2021-02-26 00:00:00	2021-01-01 00:00:00		
source	SupportedSources.CORE	SupportedSources.CORE		
journal				
volume				
doi	None	10.34657/8575		
urls	• https://core.ac.uk/download/402104856.pdf	• https://core.ac.uk/download/387602047.pdf		
id	id6693346444149903573	id9214043523725641388		
abstract	Stein variational gradient descent (SVGD) refers to a class of methods for Bayesian inference based on in-teracting particle systems. In this paper, we consider the originally proposed deterministic dynamics as well asa stochastic variant, each of which represent one of the two main paradigms in Bayesian computational statis-tics:variational inferenceandMarkov chain Monte Carlo. As it turns out, these are tightly linked througha correspondence between gradient flow structures and large-deviation principles rooted in statistical physics.To expose this relationship, we develop the cotangent space construction for the Stein geometry, prove its ba-sic properties, and determine the large-deviation functional governing the many-particle limit for the empiricalmeasure. Moreover, we identify theStein-Fisher information(orkernelised Stein discrepancy) as its leadingorder contribution in the long-time and many-particle regime in the sense ofÎ“-convergence, shedding some lighton the finite-particle properties of SVGD. Finally, we establish a comparison principle between the Stein-Fisherinformation and RKHS-norms that might be of independent interes	Stein variational gradient descent (SVGD) refers to a class of methods for Bayesian inference based on interacting particle systems. In this paper, we consider the originally proposed deterministic dynamics as well as a stochastic variant, each of which represent one of the two main paradigms in Bayesian computational statistics: variational inference and Markov chain Monte Carlo. As it turns out, these are tightly linked through a correspondence between gradient flow structures and large-deviation principles rooted in statistical physics. To expose this relationship, we develop the cotangent space construction for the Stein geometry, prove its basic properties, and determine the large-deviation functional governing the many-particle limit for the empirical measure. Moreover, we identify the Stein-Fisher information (or kernelised Stein discrepancy) as its leading order contribution in the long-time and many-particle regime in the sense of T-convergence, shedding some light on the finite-particle properties of SVGD. Finally, we establish a comparison principle between the Stein-Fisher information and RKHS-norms that might be of independent interest		
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