cases	doc_1		doc_2		decision	id
			authors	• S. Yagiz Olmez • Amirhossein Taghvaei • Prashant G. Mehta	DUPLICATES	56
	authors	• S. Yagiz Olmez • Amirhossein Taghvaei • Prashant G. Mehta	**title**	Deep FPF: Gain function approximation in high-dimensional setting		
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	urls	• https://openalex.org/W3091018929	**id**	id-7062360908315444288		
	id	id8456154421871721734	**abstract**	In this paper, we present a novel approach to approximate the gain function of the feedback particle filter (FPF). The exact gain function is the solution of a Poisson equation involving a probability-weighted Laplacian. The numerical problem is to approximate the exact gain function using only finitely many particles sampled from the probability distribution. Inspired by the recent success of the deep learning methods, we represent the gain function as a gradient of the output of a neural network. Thereupon considering a certain variational formulation of the Poisson equation, an optimization problem is posed for learning the weights of the neural network. A stochastic gradient algorithm is described for this purpose. The proposed approach has two significant properties/advantages: (i) The stochastic optimization algorithm allows one to process, in parallel, only a batch of samples (particles) ensuring good scaling properties with the number of particles; (ii) The remarkable representation power of neural networks means that the algorithm is potentially applicable and useful to solve high-dimensional problems. We numerically establish these two properties and provide extensive comparison to the existing approaches.		
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