	doc_1	doc_2	decision	id
cases			DUPLICATES	278

doc_1	
authors	• Stefan Kremsner and Alexander Steinicke and Michaela SzÃ¶lgyenyi
title	A deep neural network algorithm for semilinear elliptic PDEs with applications in insurance mathematics
publication_date	2020-12-10 00:00:00
source	SupportedSources.INTERNET_ARCHIVE
journal	
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doi	
urls	• https://web.archive.org/web/20201101033817/https://arxiv.org/pdf/2010.15757v1.pdf
id	id-3806930432709325164
abstract	In insurance mathematics optimal control problems over an infinite time horizon arise when computing risk measures. Their solutions correspond to solutions of deterministic semilinear (degenerate) elliptic partial differential equations. In this paper we propose a deep neural network algorithm for solving such partial differential equations in high dimensions. The algorithm is based on the correspondence of elliptic partial differential equations to backward stochastic differential equations with random terminal time.
versions	

doc_2	
authors	• Stefan Kremsner • Alexander Steinicke • Michaela SzÃ¶lgyenyi
title	A Deep Neural Network Algorithm for Semilinear Elliptic PDEs with Applications in Insurance Mathematics
publication_date	2020-12-09 00:00:00
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doi	10.3390/risks8040136
urls	• https://web.archive.org/web/20220623090055/https://mdpi-res.com/d_attachment/risks/risks-08-00136/article_deploy/risks-08-00136-v2.pdf?version=1608030954
id	id5860805019119889072
abstract	In insurance mathematics, optimal control problems over an infinite time horizon arise when computing risk measures. An example of such a risk measure is the expected discounted future dividend payments. In models which take multiple economic factors into account, this problem is high-dimensional. The solutions to such control problems correspond to solutions of deterministic semilinear (degenerate) elliptic partial differential equations. In the present paper we propose a novel deep neural network algorithm for solving such partial differential equations in high dimensions in order to be able to compute the proposed risk measure in a complex high-dimensional economic environment. The method is based on the correspondence of elliptic partial differential equations to backward stochastic differential equations with unbounded random terminal time. In particular, backward stochastic differential equationsâ€”which can be identified with solutions of elliptic partial differential equationsâ€”are approximated by means of deep neural networks.
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