数系 勤笃
天地 求真

中国科学院数学与系统科学研究院
Academy of Mathematics and Systems Science
Chinese Academy of Sciences

首 页 | 单位概况 | 组织机构 | 研究队伍 | 科研成果 | 教育培养 | 党群文化 | 人与事 | 期刊学会 | 图书馆 | 信息公开

现在位置： 首页 > 学术报告

Academy of Mathematics and Systems Science, CAS
Colloquia & Seminars

Speaker:	闫亮教授，东南大学
Inviter:	刘晓东
Title:	Failure-informed adaptive sampling for PINNs
Time & Venue:	2022.11.18 19:00-20:00 腾讯会议号： 414-955-469
Abstract:	

Physics-informed neural networks (PINNs) have emerged as an effective technique for solving PDEs in a wide range of domains. Recent research has demonstrated, however, that the performance of PINNs can vary dramatically with different sampling procedures, and that using a fixed set of training points can be detrimental to the convergence of PINNs to the correct solution. In this talk, we present an adaptive approach termed failure-informed PINNs(FI-PINNs), which is inspired by the viewpoint of reliability analysis. The basic idea is to define a failure probability by using the residual, which represents the reliability of the PINNs. With the aim of placing more samples in the failure region and fewer samples in the safe region, FI-PINNs employs a failure-informed enrichment technique to incrementally add new collocation points to the training set adaptively. Using the new collocation points, the accuracy of the PINNs model is then improved. The failure probability, similar to classical adaptive finite element methods, acts as an error indicator that guides the refinement of the training set. When compared to the conventional PINNs method and the residual-based adaptive refinement method, the developed algorithm can significantly improve accuracy, especially for low regularity and high-dimensional problems. We prove rigorous bounds on the error incurred by the proposed FI-PINNs and illustrate its performance through several problems.

【打印本页】【关闭本页】

电子政务平台 | 科技网邮箱 | ARP系统 | 会议服务平台 | 联系我们 | 友情链接

中国科学院
CHINESE ACADEMY OF SCIENCES