Physics Informed Machine-Learning based Computational mechanics

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Abstract:

Nowadays, the Physics-Informed Neural Network (PINN)-based computational mechanics is being rapidly developed, although it is currently still in its infant stage. It has been becoming a game-changer for computer modelling and simulation for engineering and science. This talk will first overview the most recent developments of PINN for computational mechanics. The main challenges in PINN based computational mechanics are discussed. Second, the recent research in the speaker's group on PINN will also be reported in this talk, including the new loss function approach for PINN and applications in different fields. It has proven that physics-informed machine learning will be a new powerful tool for computational mechanics.

Bio-data:

Professor YuanTong Gu is Head of the School of Mechanical, Medical and Process Engineering at Queensland University of Technology (Australia) and The Director of the Australian ARC Training Centre for Joint Biomechanics. Prof Gu is a world-renowned expert in computational mechanics and mechanical engineering. He has secured more than $20M in research funds in relevant fields and authored more than 370 refereed journal publications. Most of his publications are in highly ranked journals, including Nature Communications. His publications have attracted more than 14K citations. He is Associate Editor for two prestigious international journals and an Editorial Board Member for other five journals. Prof Gu has obtained several awards and prizes in computational mechanics, including The APACM Computational Mechanics Award. He has been invited to give more than 30 plenary and invited talks at international conferences. He served as the conference chair for two international conferences and will organize The 9th Asian Pacific Congress on Computational Mechanic in 2025 at Brisbane.