Imposition of boundary conditions for PINNs in high-dimensional nonlinear parabolic PDEs and applications

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Abstract: One of the main drawbacks in the use of neural networks to solve PDEs via PINNs methodology is the difficulty in imposing the boundary conditions. The standard approach consists of adding them as penalty terms in the training loss function. We propose a novel methodology that allows us to get rid of the heuristic choice of the associated penalty weights. It is based on defining the losses associated to the boundaries by means of the PDEs that arise from substituting the related conditions into the model equation itself. This approach is applied to challenging problems appearing in quantitative finance, namely, in counterparty credit risk management.

References:

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