CRUNCH Seminars at Brown, Division of Applied Mathematics

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The trial and errors of physically informing neurons

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I will describe our journey with PINNs, which started in 2019. I will share why we think PINNs will ultimately be the way to go; why it is worth exploring in spite of the current challenges in speed of convergence, accuracy, and generalization. I will also share our attempts in solving these problems, from physically informing neurons of the solution domain using encoding mechanisms, to neuron splitting, to dimension scaling, to PDE boundary inclusion, and more. Though many of these proposed solutions can serve PINNs in generaI, I will focus on example PDEs pertaining to wave phenomena problems, including real data examples.