

CRUNCH Seminars at Brown, Division of Applied Mathematics

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TLearning Local Conservation Laws via Inversion

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I will talk about a new approach to solving the problem of informing neural networks of local conservation laws, which is inspired by dual representations of continuum dynamics via inversion transform. In this approach, a ResNet is not explicitly trained to learn any partial differential equation, but I show that it can be informed of local conservation laws from a purely data-driven perspective just by connecting inversion transform layers to the front- and back-end of the network, which is referred to as inversion-transformed residual neural network (to abbreviate, inversion net or InvNet). I share and discuss some successful results I obtained by applying it to solving the advection/Fokker-Planck/Burgers'/Euler equations.