Structure-preserving Scientific Machine Learning

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Scientific machine learning is an emerging research area that uses machine learning techniques to solve differential equations. In this talk we review novel approaches for the design of neural network architectures, that encode important properties of the equations being solved, such as their Lagrangian or Hamiltonian structure. We explain how the underlying geometry guides the design process of new architectures that are specifically tailored to the solution of a specific problem. Finally, we apply these techniques for the construction of structure-preserving reduced order models.