Physics-Guided Deep Learning for Drag Force Prediction in Dense Fluid-Particulate Systems

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What did the authors try to accomplish?

- introduced PhyNet for Drag Force Prediction
- new approach since the relationship between input variables and output is not explicitly available from physical equations

What were the key elements of the approach?

1. physics-guided design of neural network architectures
    - each layer (partly convolutional) learns one of the various physical properties to produce drag force

2. learning with auxiliary tasks involving physical intermediate variables
    - sequential pattern: since earlier layers correspond to physical phenomena which have a direct effect on phenomena learned in deeper layers (→ physically consistent representation)
3. physics-guided aggregate supervision of neural network training
    - statistical constraints used during model training to encourage the learning of more physically consistent representations

What parts can you use yourself?

- see Mind Map

What other references do you want to follow?

- follow reference section