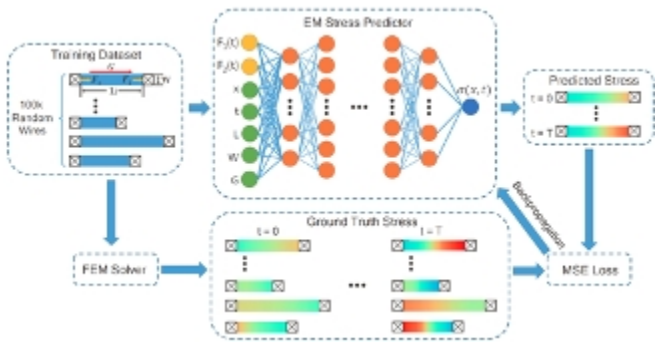




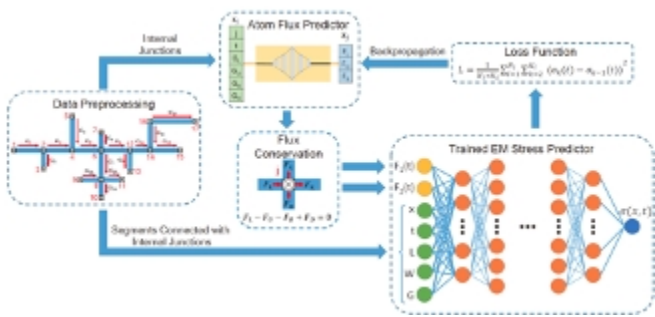
Prof. Sheldon Tan and his team at UCR have developed a new hierarchical learning based EM analysis technique called HierPINN-EM to solve the Korhonen equations for multi-segment interconnects. Instead of solving the interconnect tree as a whole, HierPINN-EM splits the physics laws into two levels and solves the PDE equations step-by-step. The first step of HierPINN-EM is a stress predictor/solver and predicts the EM-induced stress for any location on the wire at a given aging time instant. In the second step, another DNN is employed to output EM stress at the internal junctions.

Images

The two images below show the frameworks for the first and second step.



Framework for the first step



Framework for the second step

ADVANTAGES

Compared with plain PINN, HierPINN-EM achieves much better accuracy (more than 80 times lower root mean square error (RMSE) and much faster training speed (923 times speedup). HierPINN-EM achieves much faster inference speed. HierPINN-EM yields better accuracy (19% lower) RMSE with much faster training speed (120 times speedup) compared to EM-Graph. HierPINN-EM has better result resolution which can be easily controlled at inference time.

SUGGESTED USES

Machine learning EDA simulation for VLSI chip design

INVENTOR INFORMATION

Please visit Prof. Tan's [VLSI System and Computation Lab](#) to learn more about their research at UCR.

RELATED MATERIALS

- [HierPINN-EM: Fast Learning-Based Electromigration Analysis for Multi-Segment Interconnects Using Hierarchical Physics-informed Neural Network](#)

