Bowen Ren

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Education

Tsinghua University   June 2021 – now

Bechelor in Mathematics   *Beijing China*
- Core courses: numerical analysis(3.6), convex optimization(4.0), analytic mechanics(4.0), Physics-based simulation(4.0), Scientific Computing with Matlab(4.0), computer graphics(N/A), deep learning(4.0), Advanced Linear Algebra(3.6, 4.0), functional analysis(3.6).

Research Experience

Apply PINNs to Solve Navier–Stokes equations

Tsinghua University   *Beijing China*
- Applied Physics Informed Neural Networks (PINNs) in solving two-dimensional steady-state Navier-Stokes equations and taking several methods to improve accuracy of the solution.
- Got the third highest score in poster presentation as the course project of deep learning.

Differentiable simulation

Tsinghua University   *Beijing China*
- Perfected the relevant code, including the implementation of actuation and the derivative of actuation
- Derived the formulas for the distance between two triangles, as well as their derivatives and the Hessian matrix, and completed the corresponding code.
- Explored the feasibility of different implementations of Dirichlet boundary conditions in the code.
- Created differentiable examples and conducted corresponding analysis.

Cloth Simulation with Gaussian Splatting

Tsinghua University   Carnegie Mellon University   *Beijing China   Pittsburgh USA*
- Utilize the powerful reconstruction technology of 2d Gaussian Splatting to further explore its application in cloth simulation.
- Combined with related work, achieved 3d segmentation in 2d Gaussian Splatting.
- Implemented mass-spring system on segmented 2d Gaussians as a baseline.
- Extract mesh from 2d Gaussians and apply finite element method(ongoing).

Selected Award

Silver Medal

Chinese Mathematical Olympiad   *2020*

Skills

Programming: Python, C++, Matlab, CUDA(a little)