STATIK DYNAMIK
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Master's Thesis

MULTIGRID SOLVER FOR COUPLED SIMULATION OF PARTIALLY SATURATED-SOILS PROBLEM

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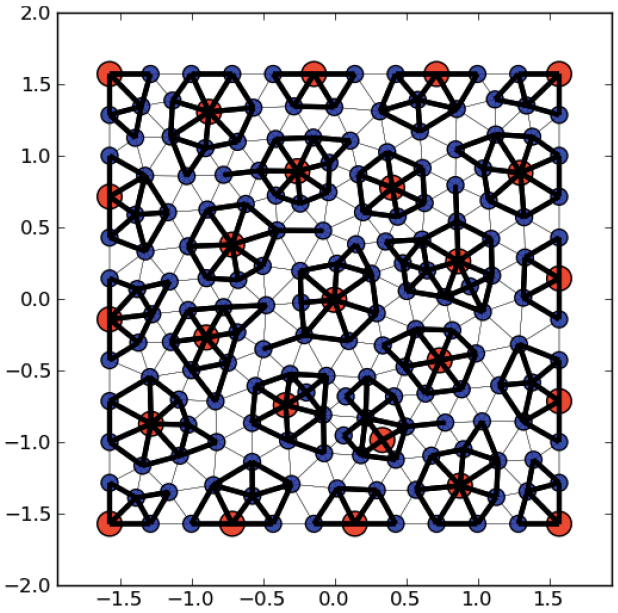
Background:

Multigrid method emerges as a versatile solver for numerical computation. The attractiveness comes from its parallel efficiency and preservation characteristic. To solve a big linear system with high accuracy, multigrid method transfers the big problem to a smaller problem with suitable restriction operator. The small linear system is then solved and transferred back to the original system using a prolongation operator. With a well-designed transfer operator, multigrid method can solve the problem without losing its accuracy. Multigrid method can serve as both a solver or as a preconditioner to speed up other iterative methods.



Tasks:

- Implement in C/C++ the simple smoothed-aggregation multigrid solver based on open source code PyAMG.
- Parallelize computing-intensive code for multi-threaded CPU.
- Apply and optimize the solver for partially saturated-soils problem.

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