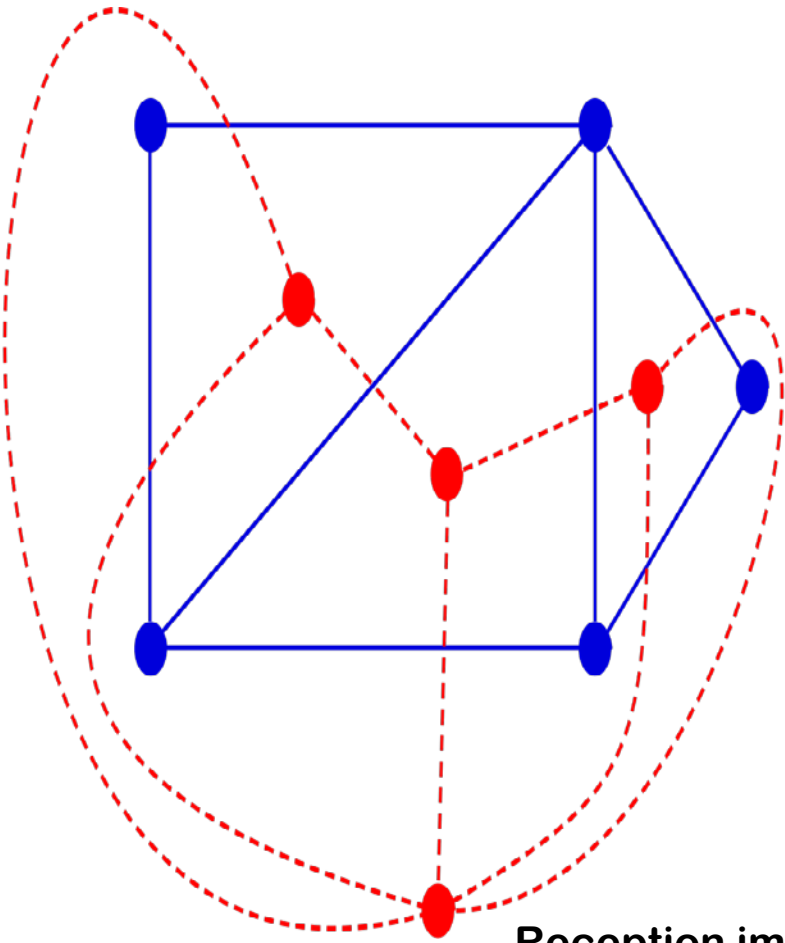


COLLOQUIUM

Title: Direct Parallel-in-Time Solvers and Backward Heat Conduction Problem



9-7-23

Jun Liu

**Southern Illinois
University - Edwardsville**

Time: 3-4:00 pm

Place: Neckers 156

Reception immediately following in the Math Library.

Abstract: In this talk, I will first briefly introduce some parallel in time (PinT) algorithms, including the widely used parareal algorithm and the diagonalization-based algorithms. I will then present our new well-conditioned direct PinT solvers, which show promising parallel efficiency for solving time-dependent differential equations (ODEs and PDEs). As an application, I will show how PinT algorithms can be applied to inverse PDE problems. Within the framework of quasi-boundary value method (QBVM), we designed a direct PinT solver for the ill-posed Backward Heat Conduction Problem. The novel idea is to maneuver the flexibility of regularization for better structured systems that enable fast diagonalization. The high efficiency of the proposed PinT algorithms is illustrated by numerical examples.