

Applied Mathematics Seminar

Dr. Erin Carrier --- GVSU School of Computing



Friday, November 19, 2021

1-1:50pm - MAK B2124 or [via zoom](#) (request password from ortizron at gvsu dot edu)

Solving Discretized Linear Systems: How to Exploit Compression

Abstract: Solving systems of linear algebraic equations is crucial for many computational problems in science and engineering. Numerous techniques are available for solving such linear systems, including direct methods such as Gaussian elimination and iterative methods such as GMRES. This work proposes a method for exploiting compression while computing the solution to a given discretized system of linear algebraic equations and investigates both its overall effectiveness in practice and which factors determine its effectiveness. The method is based on computing an approximate solution in a reduced space, and thus we seek a basis in which the solution has a compressed representation and can consequently be computed more efficiently. We address how to compute an approximate solution to the given discretized linear system using a given basis, how to choose a basis that yields significant compression, and how to detect when the basis is of sufficient dimension to provide a satisfactory approximation. We demonstrate that the resulting method can be competitive with, and sometimes outperform, current standard methods and is effective for efficiently solving linear systems resulting from the discretization of major classes of continuous problems.

More info: <http://bit.ly/applied-math-seminar>