



THE HONG KONG  
POLYTECHNIC UNIVERSITY  
香港理工大學



DEPARTMENT OF APPLIED MATHEMATICS

應 用 數 學 系

## The Hong Kong Polytechnic University Department of Applied Mathematics

SIAM PolyU student Chapter lecture

Newton's Method in Mixed Precision

By

Prof. C. T. Kelley  
North Carolina State University

### Abstract

We consider using reduced precision to solve the linear equation for the Newton step. If one neglects the backward error in the linear solve, then the standard convergence theory implies that using single precision in the linear solve has very little negative effect on the nonlinear convergence rate.

However, if one considers the effects of backward error, then the usual textbook estimates are very pessimistic and even the state-of-the-art estimates using probabilistic rounding analysis do not fully conform to experiments. We show via a specific example how pessimistic these estimates can be.

**Date : 13 November, 2020 (Friday)**

**Time : 16:30-17:30** (Hong Kong Standard Time GMT +8)

**Venue : Online via Zoom**

**Speaker: Prof. C. T. Kelley, North Carolina State University**

**Host: Prof. Chen Xiaojun, The Hong Kong Polytechnic University**

**Registration Link:**

<https://polyu.zoom.us/meeting/register/tJAucuisrDkvG9YSGvUBmY0W8TWWWxS7KhH2>



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Successful registrant will receive a confirmation email with a web link and password for the online lecture.  
Should you have any queries, please contact Miss Cindy Lu (email: chingching.lu@polyu.edu.hk).