

Abstract Submitted  
for the DFD16 Meeting of  
The American Physical Society

**Towards** **mitigating** **Asyn-**  
**chronous Computing effects in largescale simulations** ANKITA MITTAL,  
SHARATH GIRIMAJI, Texas AM Univ — Synchronization of processing elements  
(PEs) in massively parallel simulations has shown to significantly affect scalability  
of scientific applications. Relaxing this synchronization among PEs (asynchronous)  
conserves the stability condition but severely affects the accuracy reducing the av-  
erage error to first-order regardless of the original scheme. At the present time,  
several approaches are under consideration to improve the order of asynchronous  
computations. In this work, we propose to modify the original governing equation  
to obtain a Proxy-Equation which when solved asynchronously recovers the order  
of accuracy of the original numerical scheme. Performing 1D simulations for the  
Advection Diffusion Equation, we observe that the wave speed and the viscosity  
must be increased in the vicinity of PE boundaries in order to counteract the effect  
of asynchrony. In addition to recovering accuracy, this method shows lower mag-  
nitudes of average error when compared to existing asynchronytolerant methods.  
Similar results are also presented for a 1D viscous Burgers equation.

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Date submitted: 14 Jul 2016

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