

***Some Dos and Don'ts of Exponential Integration*****Mayya Tokman****(University of California, Merced)**

Exponential integration has taken a more prominent role in scientific computing over the past decades. Exponential schemes offer computational savings for many problems involving large stiff systems of differential equations. Careful design of a practical exponential scheme is crucial, however, to ensure that the resulting method is efficient for a particular equation. In this talk we will discuss what important questions have to be addressed in order to construct and to use an exponential method in the most effective way. In particular, we will address the interplay between the structure of a time integrator and the numerical linear algebra algorithms needed to evaluate the exponential-like functions of large stiff matrices and vectors in building an efficient method. Construction of hybrid integrators for partitioned problems which combine implicit and exponential approaches will also be discussed. Finally, we will present some applications where exponential integrators can be effectively used.