

High Performance Applications with Advanced Numerical Analysis on the .NET Framework

Abstract

In recent years, the programming paradigm of the .NET Framework has quickly been adopted for advanced numerical analysis with the financial services community, long known as early adopters leading the movement. The .NET Framework is a strong platform for many reasons, including advanced programmer productivity, type safety, security policies, but with off-the-shelf convenience. However, many programmers may question the suitability of the platform for advanced numerical applications.

This paper will explore some of the strengths of the .NET platform with respect to numerical analysis. Many tips for increasing the performance of .NET applications will be presented. Additionally, as programs that require advanced mathematical and statistical algorithms are developed or ported to the .NET Framework, there is a natural need for third party numerical libraries. The IMSL® C# Numerical Library will be a key part of such an implementation for many users. Several features of this library that allow the .NET Framework to be used for advanced analytics will be demonstrated.

Advanced analytics are being used across multiple industries as organizations evolve from using basic analytics that simply summarize historical data to predictive analytics, which enable organizations to forecast outcomes through the use of mathematical and statistical techniques. Advanced analytics equip organizations to plan better, model new opportunities and improve the accuracy of budgets and forecasts. Retailers can more accurately manage inventory, healthcare companies can increase staff productivity, and financial services companies can improve customer retention.