Abstract:

Abstract– The emergence of powerful numeric and symbolic scientific software applications, including MATLAB, Maple, and Mathematica, has revolutionized engineering design. These applications have allowed users to perform computations and calculations at levels of sophistication and depth that were not available to practitioners even one generation ago. They have also given educators the ability to convey advanced mathematical and engineering concepts in new ways and spend more time on analysis of engineering systems and less time on remedial mathematics. This new capability, which has become a fundamental tool for sophisticated designers in industry, is still not fully embraced in many engineering curricula.
To exemplify the potential of scientific software in the engineering classroom, we describe a laboratory exercise conducted by second-year engineering students at Drexel University. It introduces a geosynchronous satellite orbital entry problem, and demonstrates how scientific software can help students understand the behavior of an interesting physical system in a way that would have required much more effort using traditional methods.
We believe that early introduction to symbolic computation tools and scientific software would be very valuable to engineering students. Such tools should become standard instruments in the arsenal of present-day engineers. Moreover, their use should be adopted across the curriculum (not only in introductory mathematics classes) and become part of the design experience in all engineering disciplines.

BibTex Reference:

```
@inproceedings{APK10,
    author="P. Abichandani and R.Primerano and M. Kam",
    title="Symbolic Scientific Software Skills for Engineering Students",
    booktitle="{Proc. Transforming Engineering Education: Creating
Interdisciplinary Skills for Complex Global Environments ({TEE}'10)}",
    address = "Dublin, Ireland ",
    month="April",
    year= "2010"
}
```

Text Reference:
P. Abichandani, R. Primerano, and M. Kam, "Symbolic Scientific Software Skills for Engineering Students", in proceedings of Transforming Engineering Education: Creating Interdisciplinary Skills for Complex Global Environments, Dublin, Ireland, April 2010.