Using the trajectory piecewise-linear approach for model reduction of electronic circuits simulation

Juan Pablo Amorocho D.

September 10, 2008

Abstract

The use of the trajectory piecewise-linear (TPWL) approach is a promising technique for passivity-preserving model reduction of non-linear differentialalgebraic equations.

The TPWL approach reduces of a non-linear system by generating a sequence of linear subsystems, reducing them separatedly, and finally assembling them to approximate the original non-linear model. A special feature of the method is that it uses a single *training trajectory* to simulate the linear subsystems.

Although the application of TWPL has shown encouraging results, there remains aspects to further investigate. On the one hand the selection of the linearization points remains to be automatized, and on the other the re-assemble procedure requires a less heuristic algorithm. As in other problems involving model reduction, the choice of the appropriate projection basis is also a challenge. Moreover, the use of balanced truncation methods is being currently studied for an error bound of the TPWL is desired.

In this first stage the method is studied using simple problems. Prelimininary results are shown