

## Real-time dynamic substructuring using delay differential equations

Yuliya Kyrychko<sup>1\*</sup>, S.J. Hogan<sup>1</sup>, A. Gonzalez-Buelga<sup>2</sup>, D.J. Wagg<sup>2</sup>

<sup>1</sup> Department of Engineering Mathematics, University of Bristol, Bristol, BS8 1TR, United Kingdom

<sup>2</sup> Department of Mechanical Engineering, University of Bristol, Bristol, BS8 1TR, United Kingdom

\* Electronic Address: [Y.Kyrychko@bristol.ac.uk](mailto:Y.Kyrychko@bristol.ac.uk)

Real-time dynamic substructuring is a new component testing method for simulating the dynamics of complex engineering systems [1]. The physical component is tested in a computer generated 'virtual' environment using real time control techniques. Delays which occur between the component and the virtual environment can potentially destabilise the simulation [2]. Here the mechanism for this instability is studied using a beam oscillator system as a case study. The system dynamics is governed by partial neutral delay differential equation. We show how the stability and the amplitude response of the system change with the time delay. We present the comparison between the theoretical, numerical and experimental results and these agree remarkably well [3].

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