## Abstract

Time-variant systems must be treated with those algorithms that can take into account the variation of the system with time. In this article, we consider the case of a slender pinned-pinned plate carrying a moving load, simulating the well-known example of a bridge crossed by vehicles or trains. We propose two different methods to extract dynamic parameters from such a system. The identification is evidently more complex because the system input is unknown (output-only measures). To simulate such a system and to control the system parameters, a scaled train bridge excited by a crossing train has been built keeping with realistic conditions. The model described is very useful because of its simplicity and the repeatability of measurements; the goal of this article is to look at the different information given by two alternative tools, developed by two main groups involved in the research. This system is "almost" linear and it varies with time. In addition, its dynamic parameters change due to the varying position of the load, crossing the system at constant speed. Accelerations are measured along the beam, at different locations. One of the two methods proposed is a time-frequency approach (CWT) and the other is a modified version of the SSI method, referred to here as short-time stochastic subspace identification (ST-SSI). Time-frequency maps allow one to follow the instantaneous frequency variations along the bridge crossing and, by adopting the appropriate techniques, these instruments can follow the frequency skeleton and the damping along time, as for the case of the proposed ST-SSI method