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Titel des Beitrags: Matrix-based product representation to support flexible multibody simulation

Abstract: The structural behavior of machine tools has a large influence on the achievable tolerances. Vibrations of a machine tool structure result in poor surface finish. Small modifications in highly dynamic machine tools on the component level may cause unpredictable changes in overall machine tool behavior. A multibody system (MBS) is able to predict product kinematics and dynamics. The authors propose a matrix based approach to combine solution neutral system representation, solution specific product representation, and product behavior in order to improve system comprehension. It comprises knowledge and experience that occur along the whole product lifecycle of machine tools and can be utilized to support preprocessing and validation of flexible multibody models (fMBS). A case study carried out together with a major industrial partner illustrates the suggested approach. This paper exemplifies the matrix based product representation at composing a flexible multibody simulation of a highly dynamic linear gear shaping machine. Preparation and evaluation of the product representation enhances inter domain root cause analysis as well as preprocessing and validation of flexible multibody models.