

## When the Travelling Salesman Meets the Piano Mover in a Digital Factory

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Increased complexity of products and manufacturing processes presents manufacturers with time-to-market and asset optimization challenges. Manufacturing engineering teams are expected to deliver flawless product launches while adhering to cost, quality and production launch targets. To meet these challenges, leading manufacturers need to utilize organizational knowledge and 3D models of product designs and manufacturing resources in order to virtually validate their manufacturing processes prior to the start of production.

Manufacturing Process Management Software like Tecnomatix Process Simulate provides a virtual environment to reach optimal solutions. One key tool is the automatic path planner developed by Kineo, a business unit of Siemens PLM Software. The path planner allows to automatically computing collision free robot trajectories while respecting all the specific constraints of the industrial robots. Kineo's robust advanced path planning makes it possible to create trajectories that are safer and faster than classic robot teaching.

This presentation will illustrate how the path planner is integrated in the manufacturer workflow and point to the constraints of the industrial environment. We will examine the use case of Body-in-White applications where many robots have to weld sheet metal components together while trying to optimize the welding sequences. This use case will highlight the challenges that can be addressed with a powerful path planner combined with Travelling Salesman Problem solver algorithms.