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Tool-holder working unit used for robot-based incremental sheet forming

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Abstract. The diversity of industrial robot applications is constantly growing, and their use in manufacturing processes is increasing year by year. One of the most flexible sheet metal forming process, used mainly for rapid prototyping or small series production, is represented by the single point incremental forming (SPIF). Usually, incremental sheet forming processes are performed by means of CNC milling machines or industrial robots, both having advantages and disadvantages. Due to the superior number of axes, especially when compared with 3-axis CNC milling machines, one of the most obvious advantage of the industrial robots rely upon their superior kinematic. The approach of this paper tackles the problem of designing a tool-holder working unit for SPIF process performed through a KUKA KR 210-2 industrial robot. After designing of the working unit, and simulating the tool path, the generated program code was used afterwards to successfully control the robot to obtain a truncated cone-shape part.

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