

Optimization of the measurement path for the car body parts inspection

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The most evident characteristics of body components used in automotive industries are two overall dimensions with much higher values compared to a third one, as well as the relatively uniform apportion of functional elements on the surface of the workpiece. During the inspection process, these characteristics determine the active measuring element to pass greater distances between the measuring areas, in comparison to the distances required for the effective measurement.

Heuristic and approximate methods for measuring path optimization have the advantage of finding a solution making fewer operations, and the found solution differs from the optimal solution with no more than 2-3%.

In the present research, optimization algorithms based on the matrix relaxation method and nearest neighbor method were imagined and applied. These algorithms have served as a basis for developing a software. This software allows the optimization of the measurement path for car body parts which characterized by areas where the inspection is carried out, relatively uniformly apportioned over the surface of the workpiece.

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The project proposes the achievement of a unitary vision on the new tendencies from the automotive and aerospace industries by researching the production chains and the afferent intelligent technologies. The researches take in view the new tendencies applied in the fabrication of the automotive and aeronautics industries. The researches have also in view the development of new materials, the application of new digital technologies for the manufacturing of prototypes of parts made from new materials, the development of control and inspection algorithms for the carosery parts, the use of efficient technologies for the cutting procedures of parts made from special materials and not in the last case the minimization of manufacturing costs by using the design of simulation models of the manufacturing fluxes.