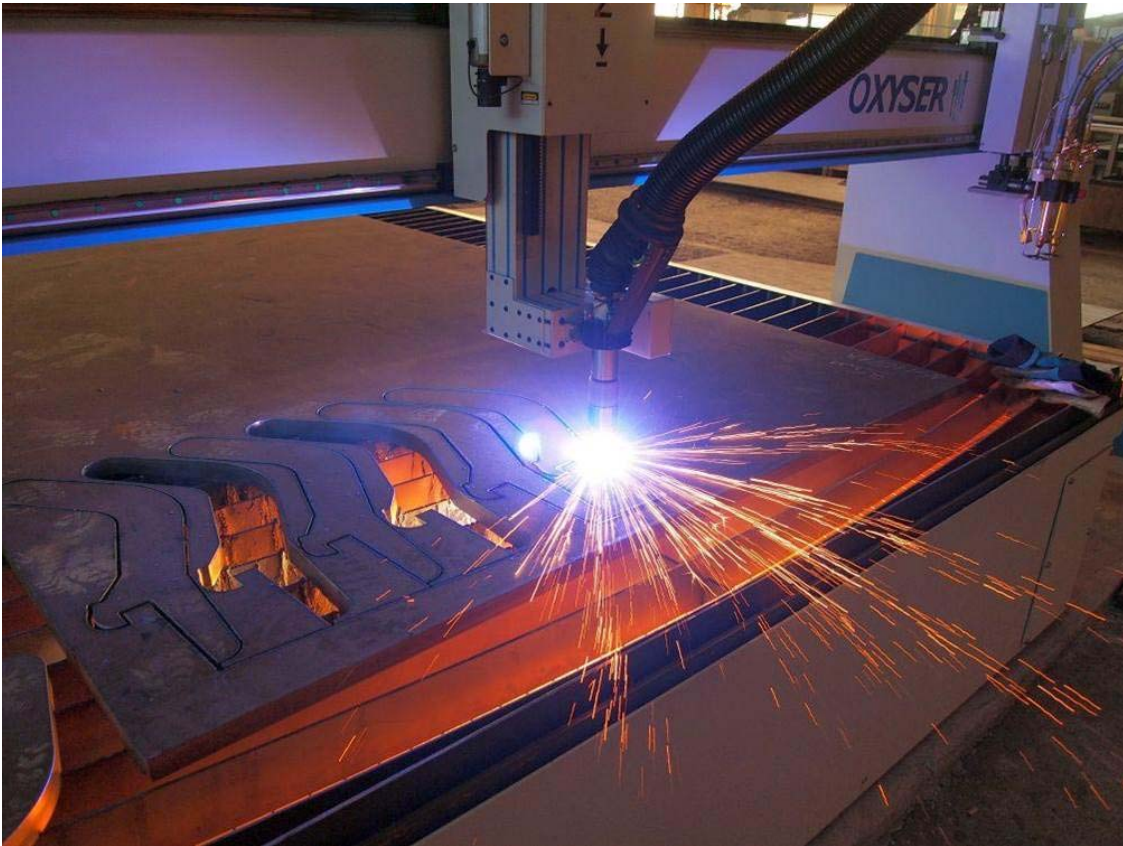


Circular arc approximation of pointwise curves for use in the NC programming

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We consider a NC (numerical control) machine which cuts hard materials. Shapes used in the cutting processing are created with lines and circular arcs. The machine must accelerate to its full speed, otherwise it damages the material. Thus, since the machine stops at the end of every element, the line segments and circular arcs should be as long as possible.

The inputs with which the machine works are sets of points in the Cartesian plane. From such a set a sequence of line segments and circular arcs that are sufficiently close to the points must be created. The case in which the points can be approximated with line segments is well investigated. We are interested in sets of points which can only be approximated by arcs. The output should consist of sets of the type $\{(x_1, y_1), (x_2, y_2), (x_c, y_c), E\}$, where (x_1, y_1) and (x_2, y_2) are respectively the initial and final points of a certain arc, (x_c, y_c) is its center and $E=+1$ if the direction of the arcs is counter clockwise or $E=-1$ if the direction of the arc is clockwise.