Combined trajectory of continuous curvature(Book Chapter)

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The problem of creating a smooth combined trajectory and determining the position of the connection points ensuring the conditions of tangency, continuity and equality of the radius of curvature are considered. When the circular and conical arcs are conjoined at the junction point, there are nonsmoothness, there is a jump in the centrifugal force due to the inequality of the radii of curvature, which will lead to a strike. A method is used to insert a transitional section, the model of which is a conic, in order to exclude the undesirable impact effect. There are known methods of continuous, smooth connection of trajectories, which include contours, splines. The condition of equality of the radii of curvature is not fulfilled at such conjugations of these curves at the junction point. The mathematical condition of unstressed connection of trajectories is established. You can define the final connection point by specifying the starting point of the connection and using the condition of the unstressed connection. The proposed method allows to design complex technical forms and create on their basis new models of a smooth trajectory from conical arcs. © Springer Nature Switzerland AG 2019