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**Title:** Tangent prolongation of  $\mathcal{C}^r$ -differentiable loops

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The aim of our paper is to generalize the tangent prolongation of Lie groups to non-associative multiplications and to examine how the weak associative and weak inverse properties are transferred to the multiplication defined on the tangent bundle. We obtain that the tangent prolongation of a  $\mathcal{C}^r$ -differentiable loop ( $r \geq 1$ ) is a  $\mathcal{C}^{r-1}$ -differentiable loop that has the classical weak inverse and weak associative properties of the initial loop.

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