

# On the formal neighborhood of arc scheme at rational points

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**Abstract:** Thanks to a theorem of Grinberg and Kazhdan (2000) and Drinfeld (2002), one knows that the formal neighborhood of the arc scheme of a variety at a rational non-degenerate arc is isomorphic to the product of the formal neighborhood of a scheme of finite type at a rational point and an infinite formal disk. It is natural to wonder if such a statement still holds when the considered arc is degenerate, i.e., contained in the singular locus of the considered variety. We will explain how Bourqui and Sebag (2015) provide a negative answer to this problem in general. We also present the subsequent work of Chiu and Hauser (2016) which proved that for every variety and every constant arc whose origin is a singular point, the corresponding formal neighborhood of arc scheme can never be described as the product a formal scheme of finite type such as in the theorem of Grinberg, Kazhdan and Drinfeld.