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The existence of compressible subsonic impinging jet flow in an arbitrary nozzle. (English)

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Summary: The main purpose of this paper is to show the well-posedness theory of two-dimensional symmetric compressible subsonic impinging jet flow. More precisely, for any given atmospheric pressure, we show that there exists a critical value, such that if the incoming mass flux is less than the critical value, then there exists a smooth symmetric compressible subsonic impinging jet flow, and the free boundary of the flow detaches smoothly from the end points of the nozzle. Moreover, the asymptotic behavior at the far field and the positivity of horizontal velocity of the flow are also obtained. On the other hand, under the star-shaped condition on the given nozzle, we will get the uniqueness of compressible subsonic impinging jet flow. Finally, we show that the vertical velocity of the flow is positive under the monotonous hypothesis on the upper nozzle wall.

MSC:

[35Q31](#) Euler equations

[76G25](#) General aerodynamics and subsonic flows

Keywords:

[arbitrary nozzle](#); [impinging jet](#); [free boundary](#); [subsonic](#); [existence](#); [uniqueness](#)

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