

## Numerical Investigations on the Coanda Effect

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**Abstract :** The Coanda effect consists of the tendency of a jet to remain attached to a sufficiently long/large convex surface. Flows deflected by a curved surface have caused great interest during last fifty years a major interest in the study of this phenomenon is caused by the possibility of using this effect to aircraft with short take-off and landing, for thrust vectoring. It is also used in applications involving mixing two of more fluids, noise attenuation, ventilation, etc. The paper proposes the numerical study of an aerodynamic configuration that can passively amplify the Coanda effect. On a wing flaps with predetermined configuration, a channel is applied between two particular zones, a low-pressure one and a high-pressure another one, respectively. The secondary flow through this channel yields a gap between the jet and the convex surface, maintaining the jet attached on a longer distance. The section altering-based active control of the secondary flow through the channel controls the attachment of the jet to the surface and automatically controls the deviation angle of the jet. The numerical simulations have been performed in Ansys Fluent for a series of wing flaps-channel configurations with varying jet velocity. The numerical results are in good agreement with experimental results.

**Keywords :** blowing jet, CFD, Coanda effect, circulation control

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