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Numerical study of flow characteristics of the high speed train entering into a tunnel

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Abstract

When a high speed train enters into a tunnel, the aerodynamic forces severely change and, consequently, the stability and performance significantly deviate from the value of design point which is usually set at cruising speed on the plain ground. The compression wave is also generated ahead of the train due to the piston-like action of tunnel entry motion. The present work is to understand the flow field such as variation of aerodynamic forces and generation of compression wave during tunnel entry motion by applying three-dimensional unsteady Navier–Stokes equation solver. To account for the relative motion of stationary tunnel and moving train, the sliding multi-block method has been implemented.



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Keywords

High speed train; Tunnel entry motion; Navier–Stokes equations; Compression wave; Aerodynamic forces; Sliding multi-block method

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