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Definition of local vortical axis flow geometry KATSUYUKI NAKAYAMA, Aichi Institute of Technology — Local vortical axis flow is defined in the vortical region in the velocity gradient field, which specifies the characteristics of the passage of a vortical axis in the core region of a vortex. The axis vector field derived from vortical axes (identified by a definition of the vortical axis) is defined, and the local axis geometry of the axis vector field is specified by the gradient tensor of its axis vector. Even though the eigenvalues of the tensor may exhibit the feature of the axis curve, it is not associated with the characteristics of the passage of the core region of a vortex. The present study specifies the convergence/divergence/rotation of a bundle of the axes in swirl plane of a vortex. The swirlity and sourcity that represent the unidirectionality and intensity of respective azimuthal and radial flows in the plane are applied to specify the characteristics of local axis geometry in the swirl plane, as a characteristic of a bundle of the axis. It shows that the bundle feature of a vortical axis such as the eigen-vortical-axis line (EVAL) or pressure minimum line is associated with the velocity structure of a vortex, and that the vortical axis associated with the local vortical flow (EVAL) tends to be stable in the intense vortical region.

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