

Instant breakup definition based on the local observations of geomagnetic field

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A set of narrow-band FIR-filtered 3-component geomagnetic data in the range of geomagnetic pulsations allows to obtain a family of 3D-polarization curves parametrized by the eigen-frequency of filtering transform.

Augment of these curves forms a surface that looks like a Mobius band. Rigorous consideration shows that this surface could be represented as Lagrange manifold similar to multi-dimensional torus.

In terms of mobile triad method the torsion of 3D-polarization curves, calculated by using Frenet formulas, is associated with direction to the source of geomagnetic pulsations because of Lagrange property. Time behavior of this torsion at the magnetic substorm onset is characterized by appearance of narrow peaks when curvature tends to a great value. Some of these peaks seem to be caused by a typical breakup of magnetic substorm.