

Accepted Manuscript

A generalization of vortex lines

M. Fecko

PII: S0393-0440(17)30263-2

DOI: <https://doi.org/10.1016/j.geomphys.2017.10.010>

Reference: GEOPHY 3091

To appear in: *Journal of Geometry and Physics*

Received date: 23 June 2017

Revised date: 15 October 2017

Accepted date: 20 October 2017



Please cite this article as: M. Fecko, A generalization of vortex lines, *Journal of Geometry and Physics* (2017), <https://doi.org/10.1016/j.geomphys.2017.10.010>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

A generalization of vortex lines

M. Fecko^{1, a)}

*Department of Theoretical Physics, Comenius University in Bratislava,
Slovakia*

Helmholtz theorem states that, in ideal fluid, vortex lines move with the fluid. Another Helmholtz theorem adds that strength of a vortex tube is constant along the tube. The lines may be regarded as integral surfaces of a 1-dimensional integrable distribution (given by the vorticity 2-form). In general setting of theory of integral invariants, due to Poincaré and Cartan, one can find d -dimensional integrable distribution (given by a possibly higher-rank form) whose integral surfaces show both properties of vortex lines: they move with (abstract) fluid and, for appropriate generalization of vortex tube, strength of the latter is constant along the tube.

PACS numbers: 02.40.-k, 45.20.Jj, 47.15ki, 47.32.C-

Keywords: vortex lines, vortex tubes, Poincaré and Cartan integral invariants, Helmholtz theorems

^{a)}Electronic mail: fecko@fmph.uniba.sk

Download English Version:

<https://daneshyari.com/en/article/8255729>

Download Persian Version:

<https://daneshyari.com/article/8255729>

[Daneshyari.com](https://daneshyari.com)