

Vinogradov, A. M.; Krasil'shchik, I. S.

On the theory of nonlocal symmetries of nonlinear partial differential equations. (English. Russian original) [Zbl 0604.58053](#)

Sov. Math., Dokl. 29, 337-341 (1984); translation from Dokl. Akad. Nauk SSSR 275, 1044-1049 (1984).

Consider a partial differential equation, which is regarded as a subset $y \subset \mathcal{J}^k(\pi)$, where $\pi : E \rightarrow M$ is a smooth bundle and $\mathcal{J}^k(\pi) \rightarrow M$ is the bundle of k -jets. To this one associates y_∞ , called "infinite extension" of y which corresponds to the set of formal solutions to the equation and on which one can consider the Cartan distribution $C(y_\infty)$. Also consider some infinite-dimensional manifold \tilde{y}_∞ with an n -dimensional integrable distribution $\tilde{C} : y \rightarrow \tilde{C}_y \subset T_y(\tilde{y}_\infty)$, $y \in \tilde{y}_\infty$ on it. A regular mapping $\tau : \tilde{y}_\infty \rightarrow y_\infty$ is called a covering over y if the map $\tau_{*,y} : \tilde{C}_y \rightarrow C_{\tau(y)}(y_\infty)$ is an isomorphism for every $y \in \tilde{y}_\infty$. The nonlocal symmetries of a differential equation are defined then to be the symmetries of its coverings. The main results from the paper show how one can compute these nonlocal symmetries for the Burgers equation.

Reviewer: [O.Liess](#)

MSC:

- [58J70](#) Invariance and symmetry properties for PDEs on manifolds
- [57R50](#) Differential topological aspects of diffeomorphisms
- [35Q99](#) Partial differential equations of mathematical physics and other areas of application
- [58A20](#) Jets in global analysis

Cited in **5** Documents

Keywords:

[Cartan distribution](#); [nonlocal symmetries](#); [Burgers equation](#)