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Applications of contact geometry and topology in physics. (English) Zbl 1279.53001

Hackensack, NJ: World Scientific (ISBN 978-981-4412-08-7/hbk; 978-981-4412-10-0/ebook). xiv, 475 p. (2013).

The book under review is divided into nine chapters. There are also four appendices at the end of this monograph. The following questions are mainly treated: fluid mechanics formulation of Hamilton and Jacobi mechanics, emergence of the force-free fields, Maxwell surfaces, Maxwell tori and associated torus knots, Woltjer's theorem, topologically massive gauge theories, contact and symplectic geometry of liquid crystals, contact geometry of thermodynamics, applications of sub-Riemannian geometry in classical and quantum mechanics, mathematics and physics of Weinstein conjecture, etc.

The appendices contain material of remarkable importance. For instance, appendix A collects some facts about the connection between Heisenberg group, sub-Riemannian geometry and Pontryagin's theory of optimal control. The largest appendix D collects a set of results of geometry and topology of entanglements.

The references list contains about 500 titles. Moreover, the appendices have their own reference lists.

Reviewer: [Mihail Banaru \(Smolensk\)](#)

MSC:

53-02 Research exposition (monographs, survey articles) pertaining to differential geometry

Cited in **10** Documents

53D10 Contact manifolds, general

53Z05 Applications of differential geometry to physics

Keywords:

[contact geometry](#); [classical mechanics](#); [quantum mechanics](#); [hydrodynamics](#); [sub-Riemannian geometry](#); [topology](#)

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