

Title	Multisymplectic numerical integrator for partial differential equations
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Author	彭, 林玉(Peng, Linyu)
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Abstract	<p>This is the first year of a two-year project on the study of geometric theories of higher-order partial differential equations and the geometric understanding and construction of geometric integrator.</p> <p>As expected, in this year, we were able to construct the geometric structure of arbitrary order variational differential equations, modelling the dynamics of physical phenomena that can be derived from variational calculus. For non-variational systems, we developed a modified formal Lagrangian formulation that allows us to formally construct a variational structure for any system of differential equations. As a first attempt, it was applied to the derivation of a structure-preserving numerical scheme for the viscous Burgers' equation.</p> <p>Part of the results were presented at domestic and international conferences. The draft 'A modified formal Lagrangian formulation for general differential equations' (arXiv:2009.04102) has been under review for publication in a leading journal of applied mathematics. Several other manuscripts will be ready for submission soon.</p>
Notes	
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研究代表者	所属	理工学部	職名	専任講師(有期)	補助額	1,000 (特A)千円
	氏名	ペング リニュー	氏名 (英語)	Linyu Peng		
研究課題 (日本語)						
Multisymplectic Numerical Integrator for Partial Differential Equations						
研究課題 (英訳)						
Multisymplectic Numerical Integrator for Partial Differential Equations						
1. 研究成果実績の概要						
<p>This is the first year of a two-year project on the study of geometric theories of higher-order partial differential equations and the geometric understanding and construction of geometric integrator.</p> <p>As expected, in this year, we were able to construct the geometric structure of arbitrary order variational differential equations, modelling the dynamics of physical phenomena that can be derived from variational calculus. For non-variational systems, we developed a modified formal Lagrangian formulation that allows us to formally construct a variational structure for any system of differential equations. As a first attempt, it was applied to the derivation of a structure-preserving numerical scheme for the viscous Burgers' equation.</p> <p>Part of the results were presented at domestic and international conferences. The draft 'A modified formal Lagrangian formulation for general differential equations' (arXiv:2009.04102) has been under review for publication in a leading journal of applied mathematics. Several other manuscripts will be ready for submission soon.</p>						
2. 研究成果実績の概要 (英訳)						
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3. 本研究課題に関する発表						
発表者氏名 (著者・講演者)	発表課題名 (著書名・演題)	発表学術誌名 (著書発行所・講演学会)	学術誌発行年月 (著書発行年月・講演年月)			
Linyu Peng, Kenji Obata	Modified formal variational structures for general differential equations	日本応用数学会 2020 年度年会	2020 年 9 月			
Linyu Peng	The infinitesimal invariance criterion for statistical transformation models	International Conference on Mathematical Characterization, Analysis and Applications of Complex Information	2020 年 9 月			