| cases | doc_1 | doc_2 | decision | id |
|---|---|---|---|---|
| **authors** | • Hyung Ju Hwang<br>• Hwijae Son | • Hyung Ju Hwang<br>• Hwijae Son | DUPLICATES | 34 |
| **title** | Lagrangian dual framework for conservative neural network solutions of kinetic equations | Lagrangian dual framework for conservative neural network solutions of kinetic equations | | |
| **publication_date** | 2021-01-01 00:00:00 | 2021-06-23 04:01:04+00:00 | | |
| **source** | SupportedSources.INTERNET_ARCHIVE | SupportedSources.ARXIV | | |
| **journal** | American Institute of Mathematical Sciences (AIMS) | None | | |
| **volume** | | | | |
| **doi** | 10.3934/krm.2021046 | | | |
| **urls** | • https://web.archive.org/web/20220203115525/https://www.aimsciences.org/article/exportPdf?id=2c29febb-0357-4db8-b694-6ec97449efc3 | • http://arxiv.org/pdf/2106.12147v1<br>• http://arxiv.org/abs/2106.12147v1<br>• http://arxiv.org/pdf/2106.12147v1 | | |
| **id** | id6580700983753614241 | id-638676526044152068 | | |
| **abstract** | <p style='text-indent:20px;'>In this paper, we propose a novel conservative formulation for solving kinetic equations via neural networks. More precisely, we formulate the learning problem as a constrained optimization problem with constraints that represent the physical conservation laws. The constraints are relaxed toward the residual loss function by the Lagrangian duality. By imposing physical conservation properties of the solution as constraints of the learning problem, we demonstrate far more accurate approximations of the solutions in terms of errors and the conservation laws, for the kinetic Fokker-Planck equation and the homogeneous Boltzmann equation.</p> | In this paper, we propose a novel conservative formulation for solving kinetic equations via neural networks. More precisely, we formulate the learning problem as a constrained optimization problem with constraints that represent the physical conservation laws. The constraints are relaxed toward the residual loss function by the Lagrangian duality. By imposing physical conservation properties of the solution as constraints of the learning problem, we demonstrate far more accurate approximations of the solutions in terms of errors and the conservation laws, for the kinetic Fokker-Planck equation and the homogeneous Boltzmann equation. | | |
| **versions** | | | | |