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Graded geometry in physics and mechanics.

Vladimir Salnikok[1]

In this talk I will describe various instances of graded and generalized geometry, appearing naturally in theoretical physics (sigma models, gauging, symmetries of functionals) and classical mechanics. For the first part, the key idea is that one can reformulate the property of gauge invariance in the language of equivariant Q-cohomology. This permits to exhibit obstructions to gauging using a nice geometric picture, and describe the symmetries of some sigma models, including the Dirac sigma model, which is universal in the space-time dimension 2. The second part is a work in progress related to a natural generalization of Hamiltonian systems to so-called port-Hamiltonian, that include dissipative systems and interaction. Generalized geometry, and in particular Dirac structures, turn out to be useful in the context.

References

[1]Université du Luxembourg, Bureau 106, Bâtiment G, Campus Kirchberg 6,
rue Richard Coudenhove-Kalergi L-1359 Luxembourg
vladimir.salnikov@uni.lu