Looking at welfare from a mathematical approach based on function spaces: searching for sustainability and fairness

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Abstract: The main objective of this research is to provide a mathematical formalization, through a novel approach based on function spaces, of concepts such as utility streams, welfare criteria, and axioms related to sustainability and fairness, all of them widely used in the Mathematical Economics literature regarding Social Choice.

The introduction of a continuous approach based on functional spaces allows us to use new mathematical insights, techniques and tools in a suitable way to tackle its analysis.

Among the main results obtained, the adaptation to functional spaces of the main welfare and fairness criteria used in the academic literature is set. Equivalently, the same is done with the main sustainability criteria.

Finally, a set of sequential criteria linked to the notion of fairness are proposed. These criteria allow the comparison between functions representing possible welfare paths. Based on such fairness criteria, a preference over the set of possible welfare paths is defined and it is verified that such preference is consistent with the idea of sustainability, verifying Pareto's axiom, the non-dictatorship of the present and the non-dictatorship of the future. Thus, a welfare criterion is formalized, that can be understood as being both sustainable and fair.

References

[1] G. Chichilnisky (1996). An axiomatic approach to sustainable development. Social Choice and Welfare 13, 231–257.