

# A Note on Topological Pseudomonotonicity in Relationship with Fan-hemicontinuity

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## Abstract

The sufficient conditions imposed on a convex Gateaux differentiable function for topological pseudomonotonicity in [1], led to a new notion for a set, called positively orientation. The function  $\nabla\|\cdot\|$  defined on its domain, having this property, is Fan-hemicontinuous. For a perturbation of a Fan-hemicontinuous operator with  $\nabla\|\cdot\|$ , weak compactness for the set of solutions of the variational inequality problem is obtained. From the corresponding definitions Fan-hemicontinuity implies topological pseudomonotonicity, but the reverse implication does not hold in general. Recently, an example of a nonlinear operator, defined on a Sobolev space, which is pseudomonotone but not Fan-hemicontinuous was given in [2]. Another one defined on a Lebesgue space is presented here.

## References

- [1] Sadeqi, I., Salehi Paydar, M.: A comparative study of Ky Fan hemicontinuity and Brezis pseudomonotonicity of mappings and existence results. *J. Optim. Theory Appl.* 165(2), 344-358 (2015)
- [2] Steck, D.: Brezis pseudomonotonicity is strictly weaker than Ky Fan hemicontinuity. *J. Optim. Theory Appl.* 181(1), 318-323 (2019)