Viscosity inexact projection methods with applications to electricity production models

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Abstract. Consider in a real Hilbert space $\mathcal{H}$. Let C be a nonempty, convex and closed subset of $\mathcal{H}$, $\mathcal{F} : C \to 2^{\mathcal{H}}$ is a cost multivalued mapping. The *variational inequality problem*, shortly VIP$(C, \mathcal{F})$, is formulated as the follows:

$$\text{Find } x^* \in C, w^* \in \mathcal{F}(x^*) \text{ such that } \langle w^*, x - x^* \rangle \geq 0, \quad \forall x \in C.$$

In this talk, we present a new inexact projection approach for the problem VIP$(C, \mathcal{F})$ without using inertial technique in a real Hilbert space. First, we introduce a new inxact projection and show some its prop- erties. By combining the inexact projection, viscosity technique and Mann-type iteration method via self-adaptive step size, we introduce a new VIP-Viscosity Inexact Projection Algorithm and prove its strong convergence under Lipschitz continuous and pseudomonotone assumptions of the cost multivalued mapping. Next, we apply the algorithm VIP to propose a new algorithm for the electricity production models. The effectiveness of the algorithm VIP is then validated by numerical experiments via computational examples of the electricity production models.

References

N.D. Hien, J.-S. Chen, N.V. Hong, P.N. Anh: Viscosity inexact projection methods with applications to electricity production models. *Communications in Nonlinear Science and Numerical Simulation.* Doi: 10.1016/j.cnsns.2025. 109471, 2025

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