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Relaxed projection and contraction method with golden ratio momentum

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This paper presents a convergence analysis of a relaxed projection and contraction algorithm incorporating golden ratio constant momentum for solving monotone inclusion problems in real Hilbert spaces. The proposed method integrates a non-monotonic self-adaptive step size, a relaxation term, and a constant momentum factor derived from the golden ratio. The non-monotonic step size method allows our algorithm to adapt effectively without requiring knowledge of the Lipschitz constant, while the relaxation and momentum terms contribute to improved flexibility, acceleration and robustness. We establish both weak and linear convergence results under mild conditions. Numerical experiments are provided to illustrate the performance of the algorithm and compare it with some pertinent results in the literature.

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