Applications of Proximal Point Algorithms to Characterize The Existence Convergence of Zero Point Problems

Lai-Jiu Lin and Sung-Yu Wang

Department of Mathematics,
National Changhua University of Education,
Changhua 50058, Taiwan
E-mail: maljlin@cc.ncue.edu.tw (L.-J. Lin);
sywang83@gmail.com (S.-Y. Wang)

Abstract

In this paper, we introduce two types of proximal point problems $(ZPP1)$ (resp. $(ZPP2)$) and two regularization methods of proximal point algorithms (1.1) (resp (1.2) for $(ZPP1)$ (resp. $(ZPP2)$).

The sufficient conditions for the boundness and the asymptotic behavior of the sequence $\{x_n\}$ generated by the regularization methods of proximal point algorithms (1.1) and (1.2) were investigated. Our result provided sufficient conditions for the case that the set of all solutions for problems $(ZPP1)$ and $(ZPP2)$ are nonempty. Finally, we proposed an equivalent condition of the existence of solutions for two types of problems $(ZPP1)$(also $(ZPP2)$).

Keywords: proximal point algorithm, zero point problem, bounded sequences, coercive maximal operator, weak cluster point, reflexive , strictly convex and smooth Banach space, duality mapping, metric resolvent mapping, Hilbert space

2020 Mathematics Subject Classification: 47J 25, 47 J20, 47H26