# TWO ORDER THEORETIC PROOFS FOR A FIXED POINT THEOREM IN PARTIALLY ORDERED METRIC SPACES AND ITS APPLICATION TO TRACE CLASS OPERATOR EQUATIONS 

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#### Abstract

In the present paper, we first give two order theoretic proofs for a known fixed point theorem in partially ordered metric spaces and then apply the results to find solutions of trace class operator equations. Key Words and Phrases: Fixed points, posets, trace class operators. 2010 Mathematics Subject Classification: 47H10, 39B42.


## References

[1] A. Baranga, The contraction principle as a particular case of Kleene's fixed point theorem, Discrete Math., 98(1991), 75-79.
[2] I. Ekeland, On the variational principle, J. Math. Anal. Appl., 47(1974), 324-353.
[3] A. Granas, J. Dugundji, Fixed Point Theory, Springer-Verlag, New York, 2003.
[4] I. Gohberg, S. Goldberg, A.M. Kaashoek, Classes of Linear Operators, Vol. I, Operator Theory: Advances and Applications, 49, Birkhäuser Verlag, Basel, 1990.
[5] J. Jachymski, Fixed point theorems in metric and uniform spaces via the Knaster-Tarski principle, Nonlinear Anal., 32(1998), no. 2, 225-233.
[6] J.J. Nieto, R. Rodriguez-López, Contractive mapping theorems in partially ordered sets and applications to ordinary differential equations, Order, 22(2005), 223-239.
[7] J.J. Nieto, R.L. Pouso, R. Rodriguez-López, Fixed point theorems in ordered abstract sets, Proc. Amer. Math. Soc., 135(2007), 2505-2517.
[8] A.C.M. Ran, M.C. Reurings, A fixed point theorem in partially ordered sets and some applications to matrix equations, Proc. Amer. Math. Soc., 132(2004), 1435-1443.

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