

*Dedicated to Prof. Billy E. Rhoades on the occasion of his 90<sup>th</sup> anniversary*

## Iterating nonlinear contractive mappings in Banach spaces

ZORAN D. MITROVIĆ, STOJAN RADENOVIĆ, SIMEON REICH and ALEXANDER J. ZASLAVSKI

### ABSTRACT.

We introduce a new class of nonlinear contractive mappings in Banach spaces, study their iterates and establish a fixed point theorem for them.

**Acknowledgments.** The third author was partially supported by the Israel Science Foundation (Grant no. 820/17), by the Fund for the Promotion of Research at the Technion and by the Technion General Research Fund.

### REFERENCES

- [1] Bisht, R. K., *A note on the fixed point theorem of Górnicki, J.* Fixed Point Theory Appl., **21** (2019), Article 54, 1–3, <https://doi.org/10.1007/s11784-019-0695-x>
- [2] Ćirić, Lj., *Some Recent Results in Metrical Fixed Point Theory*, University of Belgrade, Beograd, Serbia, 2003
- [3] Gabour, M., Reich, S. and Zaslavski, A. J., *A generic fixed point theorem*, Indian J. Math., **56** (2014), 25–32
- [4] Kannan, R., *Some results on fixed points*, Bull Calcutta Math Soc., **60** (1968), 71–76
- [5] Pant, A. and Pant, R. P., *Fixed points and continuity of contractive maps*, Filomat, **31** (2017), 3501–3506, <https://doi.org/10.2298/FIL1711501P>
- [6] Reich, S., *Some remarks concerning contraction mappings*, Canad. Math. Bull., **14** (1971), 121–124
- [7] Reich, S. and Zaslavski, A. J., *Contractivity and genericity results for a class of nonlinear mappings*, J. Nonlinear Convex Anal., **16** (2015), 1113–1122
- [8] Reich, S. and Zaslavski, A. J., *Existence of a unique fixed point for nonlinear contractive mappings*, Mathematics, **8** (2020), Article 55, 1–7, <https://doi.org/10.3390/math8010055>
- [9] Rhoades, B. E., *A comparison of various definitions of contractive mappings*, Trans. Amer. Math. Soc., **226** (1977), 257–290

NONLINEAR ANALYSIS RESEARCH GROUP  
TON DUC THANG UNIVERSITY  
HO CHI MINH CITY, VIETNAM

FACULTY OF MATHEMATICS AND STATISTICS  
TON DUC THANG UNIVERSITY  
HO CHI MINH CITY, VIETNAM  
*Email address:* zoran.mitrovic@tdtu.edu.vn

UNIVERSITY OF BELGRADE  
FACULTY OF MECHANICAL ENGINEERING  
KRALJICE MARIJE 16, 11120 BEOGRAD 35, SERBIA  
*Email address:* radens@beotel.rs

Received: 13.03.2020; In revised form: 09.06.2020; Accepted: 10.06.2020

2010 *Mathematics Subject Classification.* 47H09, 47H10.

*Key words and phrases.* Banach space, fixed point, iterate, nonlinear contractive mapping.

*Corresponding author:* Zoran D. Mitrović; zoran.mitrovic@tdtu.edu.vn

DEPARTMENT OF MATHEMATICS  
THE TECHNION-ISRAEL INSTITUTE OF TECHNOLOGY  
32000 HAIFA, ISRAEL  
*Email address:* sreich@technion.ac.il  
*Email address:* ajzasl@technion.ac.il