

## MAPS PRESERVING THE FIXED POINTS OF SUM OF OPERATORS

ALI TAGHAVI, ROJA HOSSEINZADEH AND HAMID ROHI

*Abstract.* Let  $\mathcal{B}(\mathcal{X})$  be the algebra of all bounded linear operators on a complex Banach space  $\mathcal{X}$  with  $\dim \mathcal{X} \geq 2$ . In this paper, we characterize the maps on  $\mathcal{B}(\mathcal{X})$  which preserve the fixed points of sum of operators. Moreover, if  $\mathcal{X}$  is a finite dimensional Banach space, we also characterize the maps on  $\mathcal{B}(\mathcal{X})$  which preserve the dimension of fixed points of sum of operators.

*Mathematics subject classification (2010):* 46J10, 47B48.

*Keywords and phrases:* Preserver problem, operator algebra, fixed point.

### REFERENCES

- [1] M. A. CHEBOTAR, W.-F. KE, P.-H. LEE, N.-C. WONG, *Mappings preserving zero products*, Studia Math. **155** (2003), 77–94.
- [2] M. DOBOVIŠEK, B. KUZMA, G. LEŠNJAK, C. K. LI, T. PETEK, *Mappings that preserve pairs of operators with zero triple Jordan Product*, Linear Algebra Appl. **426** (2007), 255–279.
- [3] G. DOLINAR, S. DU, J. HOU, P. LEGIŠA, *General preservers of invariant subspace lattices*, Linear Algebra Appl. **429** (2008), 100–109.
- [4] L. FANG, G. JI, *Linear maps preserving products of positive or Hermitian matrices*, Linear Algebra Appl. **419** (2006), 601–611.
- [5] L. FANG, G. JI, Y. PANG, *Maps preserving the idempotency of products of operators*, Linear Algebra Appl. **426** (2007), 40–52.
- [6] J. HOU, Q. DI, *Maps preserving numerical ranges of operator products*, Proc. Amer. Math. Soc. **134** (2006), 1435–1446.
- [7] J. HOU, C. K. LI, N. C. WONG, *Jordan isomorphisms and maps preserving spectra of certain operator products*, Studia Math. **184** (2008), 31–47.
- [8] L. K. HAU, *A theorem on matrices over a field and its applications*, Acta Math. Sinica **1** (1951), 109–163.
- [9] J. HOU, L. ZHAO, *Zero-product preserving additive maps on symmetric operator spaces and self-adjoint operator spaces*, Linear Algebra Appl. **399** (2005), 235–244.
- [10] G. JI, Y. GAO, *Maps preserving operator pairs whose products are projections*, Linear Algebra Appl. **433** (2010), 1348–1364.
- [11] C. K. LI, P. ŠEMRL, N. S. SZE, *Maps preserving the nilpotency of products of operators*, Linear Algebra Appl. **424** (2007), 222–239.
- [12] P. ŠEMRL, *Two characterizations of automorphisms on  $\mathcal{B}(\mathcal{X})$* , Studia Math. **105** (1993), 143–148.
- [13] P. ŠEMRL, N. S. SZE, *Non-linear commutativity preserving maps*, Acta Scince Math. (Szeged) **71** (2005), 781–819.
- [14] A. TAGHAVI, *Additive mappings on  $C^*$ -algebras Preserving absolute values*, Linear and Multilinear Algebra **60**, 1 (2012), 33–38.
- [15] A. TAGHAVI, R. HOSSEINZADEH, *Linear maps preserving idempotent operators*, Bull. Korean Math. Soc. **47** (2010), 787–792.
- [16] A. TAGHAVI, R. HOSSEINZADEH, *Maps preserving the dimension of fixed points of products of operators*, Linear and Multilinear Algebra, accepted.
- [17] M. WANG, L. FANG, G. JI, Y. PANG, *Linear maps preserving idempotency of products or triple Jordan products of operators*, Linear Algebra Appl. **429** (2008), 181–189.

- [18] L. ZHAO, J. HOU, *Jordan zero-product preserving additive maps on operator algebras*, *J. Math. Anal. Appl.* **314** (2006), 689–700.