

## Associate Professor Xin Liu

Department of Engineering Science, Faculty of Innovation Engineering  
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PhD. Supervisor

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### Academic Qualification:

2007.9-2010.7	Shanghai University, M. Sc
2010.9-2013.7	Shanghai University, Ph. D
2010.9-2011.10	EPFL, Swizerland, Exchange Ph.D

### Teaching Area

Calculus, Linear Algebra

### Research Area

Linear algebra and its applications

### Working Experience

2013.9-2020.8	Assistant professor in MUST
2020.9-current	Associate professor in MUST

### Research Grants

1. The real time supervision system of casino chips basing on deep learning, FDCT, 2022-2024
2. The theory of the real representation of quaternion matrix and its applications,FRG, 2022-2023
3. Algorithm on quaternion matrix equation for color image processing, 2019WGALH20, 2021-2023

### Representative publications (Complete publication refer to my webpage)

1. Y. Tian, **X. Liu\***, Y. Zhang, Least-squares solutions of the generalized reduced biquaternion matrix equations, *Filomat* (2021) Accepted (SCI)
2. C.E. Yu, **X. Liu\***, Y. Zhang, On elliptic biquaternion matrices, *Advances in Applied Clifford Algebras* (2021) 31: 5. (SCI)
3. C.E. Yu, **X. Liu\***, Y. Zhang, The generalized quaternion matrix equation, *Mathematical Methods in the Applied Sciences* 43 (15) (2020) 8506-8517. (SCI)
4. Z.Z. He, M.M Wang, **X. Liu\***, On the general solutions to some systems of quaternion matrix equations, *RACSAM* (2020) 114: 95. (SCI)
5. **X. Liu**, G.J. Song\*, Y. Zhang, Determinantal representations of the solutions to systems of generalized Sylvester equations, *Advances in Applied Clifford algebras* (2020) 30: 12.(SCI)
6. **X. Liu\***, Y. Zhang, Least-squares  $X = \pm X^{\eta*}$  solutions to split quaternion matrix equation  $AXA^{\eta*} = B$ , *Mathematical Methods in the Applied Sciences* 43 (5) (2020) 2189-2201.(SCI)
7. **X. Liu**, Z.Z. He\*,  $\eta$  -Hermitian solutions to a system of quaternion matrix equations, *Bulletin of the Malaysian Mathematical Sciences Society* 43 (2020) 4007-4027. (SCI)
8. **X. Liu**, Z.Z. He\*, On the split quaternion matrix equation  $AX = B$ , *Banach Journal of Mathematical*

*Analysis* 14 (2019) 228-248. (SCI)

9. **X. Liu\***, Q.W. Wang and Y. Zhang, Consistency of quaternion matrix equations  $AX^* - XB = C$  and  $X - AX^*B = C$ , *Electronic Journal of Linear Algebra* 35 (2019) 394-407. (SCI)
10. **X. Liu\***, Y. Zhang, Consistency of split quaternion matrix equations  $AX^* - XB = CY + D$  and  $X - AX^*B = CY + D$ , *Advances in Applied Clifford algebras* (2019) 29: 64. (SCI)
11. **X. Liu**, H.J. Huang, Z.Z. He\*, Real representation approach to quaternion matrix equation involving  $\eta$ -Hermiticity, *Mathematical Problems in Engineering* (2019) ID 3258349, 8pages. (SCI)
12. **X. Liu\***, The  $\eta$ -anti-Hermitian solution to some classic matrix equations, *Applied Mathematics and Computation* 320 (2018) 264-270. (SCI)
13. **X. Liu\***, Q.W. Wang, The Least Squares Hermitian (Anti)reflexive Solution with the Least Norm to Matrix Equation  $AXB = C$ , *Mathematical Problems in Engineering* (2017) 1-6. (SCI)
14. G.H. Yu\*, **X. Liu**, H. Qu, Singularity of Hermitian (quasi-)Laplacian matrix of mixed graphs, *Applied Mathematics and Computation* 293 (2017) 287-292. (SCI)
15. **X. Liu**, Q.W. Wang\*, Equality of the BLUPs under the mixed linear model when random components and errors are correlated, *Journal of Multivariate Analysis* 116 (2013) 297-309. (SCI)
16. K. Daniel\*, **X. Liu**, Structured canonical forms for products of (Skew-)symmetric matrices and the matrix equation  $XAX = B$ , *Electronic Journal of Linear Algebras* 35 (2013) 394-407. (SCI)
17. Q.W. Wang\*, **X. Liu**, S.W. Yu, The common bisymmetric nonnegative definite solutions with extreme ranks and inertias to a pair of matrix equations, *Applied Mathematics and Computation* 218 (6) (2011) 2761-2771. SCI
18. Q.W. Wang\*, **X. Liu**, The equalities of BLUPs for linear combinations under two general linear mixed models, *Communications in Statistics Theory and Methods* 42 (19) (2013) 3528-3543. SCI
19. **X. Liu\***, Q.W. Wang, The relations of BLUEs between the original linear model and the incorrectly linear model, *Proceedings of the Ninth International Conference on Matrix Theory and its Applications* (2009) 96-99. ISTP
20. **X. Liu\***, Q.W. Wang, The linear sufficiency with regard to BLUPs, *Proceedings of the Ninth International Conference on Matrix Theory and its Applications* 4 (2010) 49-51. ISTP
21. **X. Liu\***, Two useful Least Square g-inverse Sets' Relationship with applications, *Journal of Macau Science and Technology* 3 (2014) 103-107.
22. X. Zhang, Q.W. Wang\*, **X. Liu**, Inertias and ranks of some Hermitian matrix functions with applications, *Central European Journal of Mathematics* 10 (1) (2012) 329-351. EI
23. Q.W. Wang\*, G.J. Song, **X. Liu**, Maximal and minimal ranks of the common solution of some linear matrix equations over an arbitrary division ring with applications, *Algebra Colloquium* 16 (2) (2009) 293-308. (SCI)

