

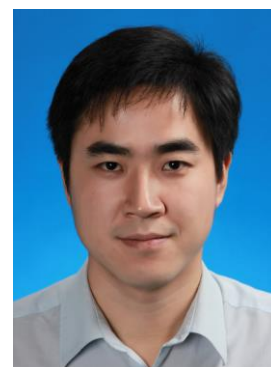
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Fault Tolerant Quantum Filtering and Fault Detection

Dr. Qing Gao
City University of Hong Kong



Abstract:

We aim to determine the fault tolerant quantum filter and fault detection equation for a class of open quantum systems that is subject to stochastic faults. A quantum-classical Bayesian inference method is introduced as a convenient tool to simultaneously derive the fault tolerant quantum filter and the fault detection equation for this class of open quantum systems. Some preliminary results about projection filtering are provided to avoid the curse of dimensionality. These results have the potential to lead to a new fault tolerant control theory for quantum systems.

Biography:

Qing Gao received the B.Eng. and Ph.D. degrees in Mechanical and Electrical Engineering from the University of Science and Technology of China (USTC), Hefei, China, in 2008 and 2013, respectively. He also received the Ph.D. degree in Mechatronics Engineering from the City University of Hong Kong, Kowloon, Hong Kong in 2014. From 2014 to 2016, he was with the School of Engineering and Information Technology, University of New South Wales, Canberra at the Australian Defence Force Academy, as a postdoctoral research associate. He is now with the Department of Applied Mathematics, Hong Kong Polytechnic University, as a postdoctoral research associate. His research interests include quantum control, intelligent systems & control, and variable structure control. Dr. Gao received the Presidential Scholarship (Special Prize) from the Chinese Academy of Sciences in 2013, the Outstanding Research Thesis Award from City University of Hong Kong in 2013, and the Outstanding Doctoral Dissertation Award from the Chinese Academy of Sciences in 2015. He is the recipient of the 21st Guan Zhao-zhi Award.