System Identification for A General Class
of Observable and Reachable Bilinear Systems

C.-H. Lee[1] and <u>J.-N. Juang</u>[2]

Abstract: A system identification method has been developed to identify a general class of reachable and observable continuous-time bilinear systems. The method uses a special input sequence in conjunction with a Hankel-like matrix constructed by carefully selected output data. A key feature of the method is that the order reduction problem is overcome by a two-stage coordinate transformation based on the notion of common null space among related system matrices. This novel identification algorithm eliminates the drawback of its predecessors that require the observability of the linear part of a bilinear system, i.e., the pair (state matrix A_c, output matrix C) must be observable. Numerical examples showed good correspondence between the identified bilinear models and the original nonlinear systems.

[1,2] Department of Engineering Science
National Cheng Kung University
1 University Road, Tainan City, Taiwan
jason491.lee@gmail.com, jjuang@mail.ncku.edu.tw