

講演会のご案内

A Geometric Approach to Multi-agent Visual Sensing

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場所: L - 921室

ABSTRACT: We begin this talk, by presenting optimal control problems on human binoculomotor system as a simple mechanical control system, extending our earlier studies on monocular system. We assume that during eye movements, each eye separately obeys a suitable form of Donders' law, a well-known physiological constraint from Biology. Additionally we assume that the gaze direction vectors, of the two eyes, remain coplanar during the entire time of the eye movement. This is equivalent to asking that the eyes are always fixated in the visual space. We define a restricted configuration space for the two eye system as a subset of $SO(3) \times SO(3)$ and describe a binocular system as a simple mechanical control system. A Riemannian metric has been introduced and the corresponding Euler Lagrange dynamics is written out. Two special cases of the Donders' surface is detailed in this paper. The first one is when the Donders' surface is the Listing's plane. The second one is when the Donders' surface for each of the two eyes are derived from Fick Gimbal. We have displayed the geodesic curves for binocular eye movements satisfying the Fick Gimbal. This talk makes contact with various problems in Riemannian geometry and Non-linear Dynamical System.



BIOGRAPHY OF BIJOY K GHOSH

Bijoy received his Ph.D. degree from the Decision and Control Group at Harvard University, Cambridge, MA, in 1983. From 1983 to 2007 Bijoy was with the Department of Electrical and Systems Engineering, Washington University, St. Louis, MO, USA, where he was a Professor and Director of the Center for BioCybernetics and Intelligent Systems. Currently he is the Dick and Martha Brooks Regents Professor of Mathematics and Statistics at Texas Tech University, Lubbock, TX, USA. He received the Donald P. Eckmann award in 1988 from the American Automatic Control Council, the Japan Society for the Promotion of Sciences Invitation Fellowship in 1997. He became a Fellow of the IEEE in 2000, and a Fellow of the International Federation on Automatic Control in 2014. Bijoy had held visiting positions at Tokyo Institute of Technology, Osaka University and Tokyo Denki University, Japan, University of Padova in Italy, Royal Institute of Technology and Institut Mittag-Leffler, Stockholm, Sweden, Yale University, USA, Technical University of Munich, Germany, Chinese Academy of Sciences, China and Indian Institute of Technology, Kharagpur, India. Bijoy's current research interest is in BioMechanics, Cyberphysical Systems and Control Problems in Rehabilitation Engineering.