Meeting: 1006, Lubbock, Texas, SS 13A, Special Session on Statistical Image Processing and Analysis and Applications

1006-78-190 **Ram V Iyer*** (rvenkata@math.ttu.edu), Rm 224, Boston and Broadway, Lubbock, TX 79409, **Raymond W Holsapple** (rholsapp@math.ttu.edu), Rm 224, Boston and Broadway, Lubbock, TX 79409, and **Phillip Chandler** (phillip.chandler@wpafb.af.mil), Bldg 146, Suite 301, Eighth Street, WPAFB, OH 45433. *On the computation of self-motion for an unmanned air vehicle from image sequences without depth information.*

In this talk, we introduce a new method for computing the linear velocity and angular velocity of an unmanned air vehicle (UAV) using only the information obtained from image sequences. In UAV applications, computational resources are limited due to payload constraints and the real-time computation requirement. Therefore, computationally intensive techniques employing feature extraction cannot be used. The alternative, in existing literature, is the computation of optical flow and the subsequent computation of motion. Both of these problems are ill-posed due to the correspondence and aperture problems.

In this talk, we consider a different approach for motion estimation that is based on the spatial differentiation of an image function. We show that the solution is a well-posed problem that involves a least squares problem and nonlinear filtering. We also discuss the implementation of such a scheme on a UAV, and discuss the existence of such schemes in insects and crustaceans. (Received February 14, 2005)