THERAPY FOR ABNORMAL MUSCLE SYNERGY IN STROKE USING THE ULIX LOW-IMPEDANCE ROBOT. Shawn J DiRocco1,2 & Peter S. Lum1, 1Department of Biomedical Engineering, Catholic University of America and 1Department of Biomedical Engineering, Virgina Commonwealth University. Patients who suffer from stroke often experience synergistic movements that make completion of activities of daily living difficult. Synergistic movements are characterized by movements made when muscles are wrongly activated when activating another muscle. Robotics is useful for therapy for these patients due to providing varying levels of assistance to complete tasks while promoting more efficient movements through resistance. A grounded 5 degree of freedom upper extremity low impedance exoskeleton was developed for stroke therapy. Various therapy modes were made to test on chronic stroke patients. The effectiveness of these therapy modes was evaluated through the competition of a reaching and hand opening task. In addition, EMG sensors were used throughout the arm muscles to evaluate changes of muscle activation patterns due to the therapy modes which would promote the best rehabilitation. Grip force data was collected through a sensor at the end of the arm exoskeleton to record force during the movement and opening force at the target location. Completion percentages and force data improved with increase gravity support in the shoulder flexion direction and motor assistance towards the target in the other joints. The EMG showed a trend to improve muscle firing patterns to reduce synergistic movements during the therapy modes. Author Contact: Shawn DiRocco, diroccos@cua.edu