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Ruzhou Yang* (yangruzhou@gmail.com), Dept. of Mechanical & Industrial Engineering, 2508 Patrick F. Taylor Hall, Louisiana State University, Baton Rouge, LA 70803-6419. *Predictor-Based Tracking for Neuromuscular Electrical Stimulation.*

We present a new tracking controller for neuromuscular electrical stimulation, which is an emerging technology that artificially stimulates skeletal muscles to help restore functionality to human limbs. The novelty of our work is that we prove that the tracking error globally asymptotically and locally exponentially converges to zero for any positive input delay, coupled with our ability to satisfy a state constraint imposed by the physical system. Also, our controller only requires sampled measurements of the states instead of continuous measurements, and allows perturbed sampling schedules, which can be important for practical purposes. Our work is based on a new method for constructing predictor maps for a large class of time-varying systems, which is of independent interest. This work is joint with Professors Iasson Karafyllis, Michael Malisoff, Marcio de Queiroz, and Miroslav Krstic. (Received January 28, 2014)