

Experimental Conditions

Joint Encoder Resolution: $3.835 \times 10^{-4} rad$
Equivalent Cylinder Displacement Resolution: 40 to 76 μm
Pressure Resolution: $1.035 \times 10^5 Pa$
Payload: 45 kg

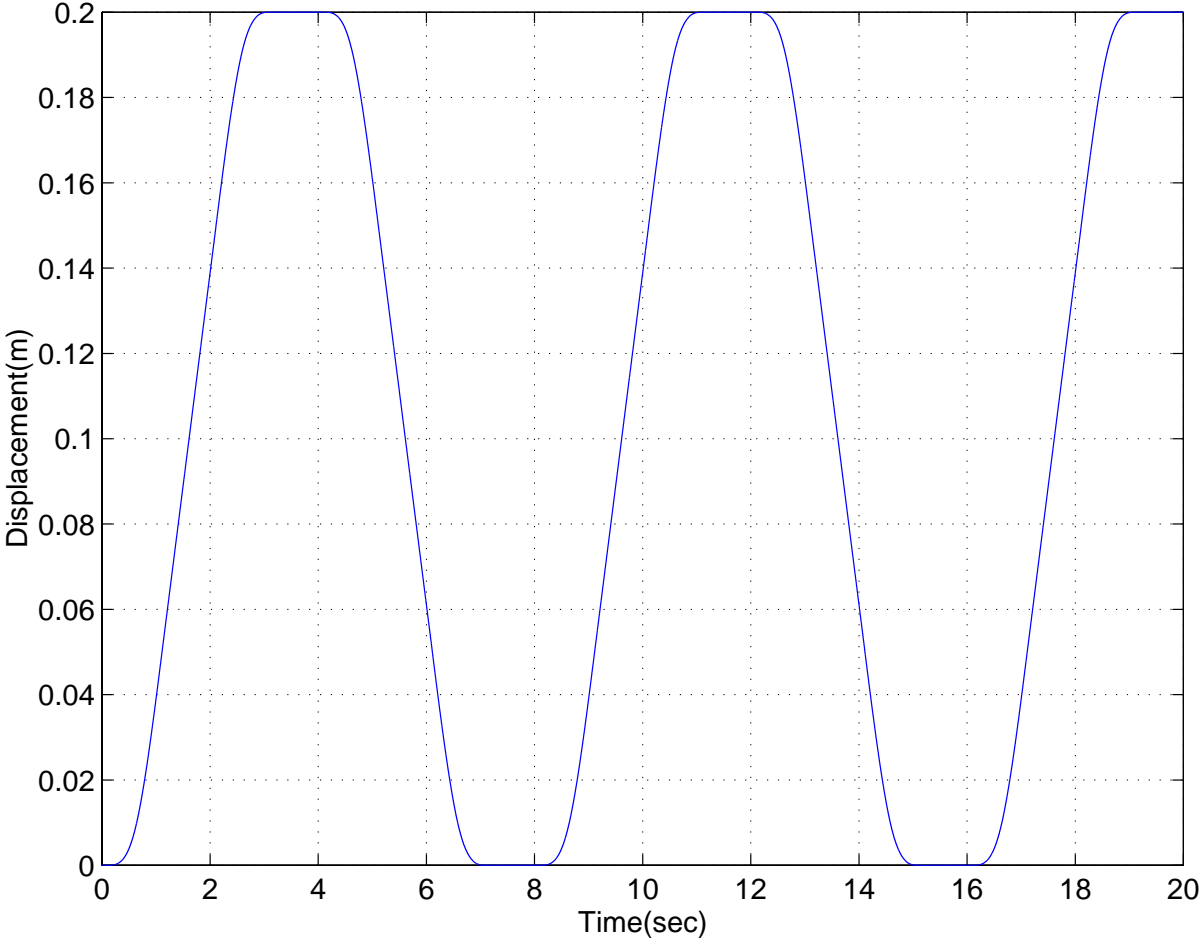


Figure 1: Trajectory for the back-and-forward point-to-point motion

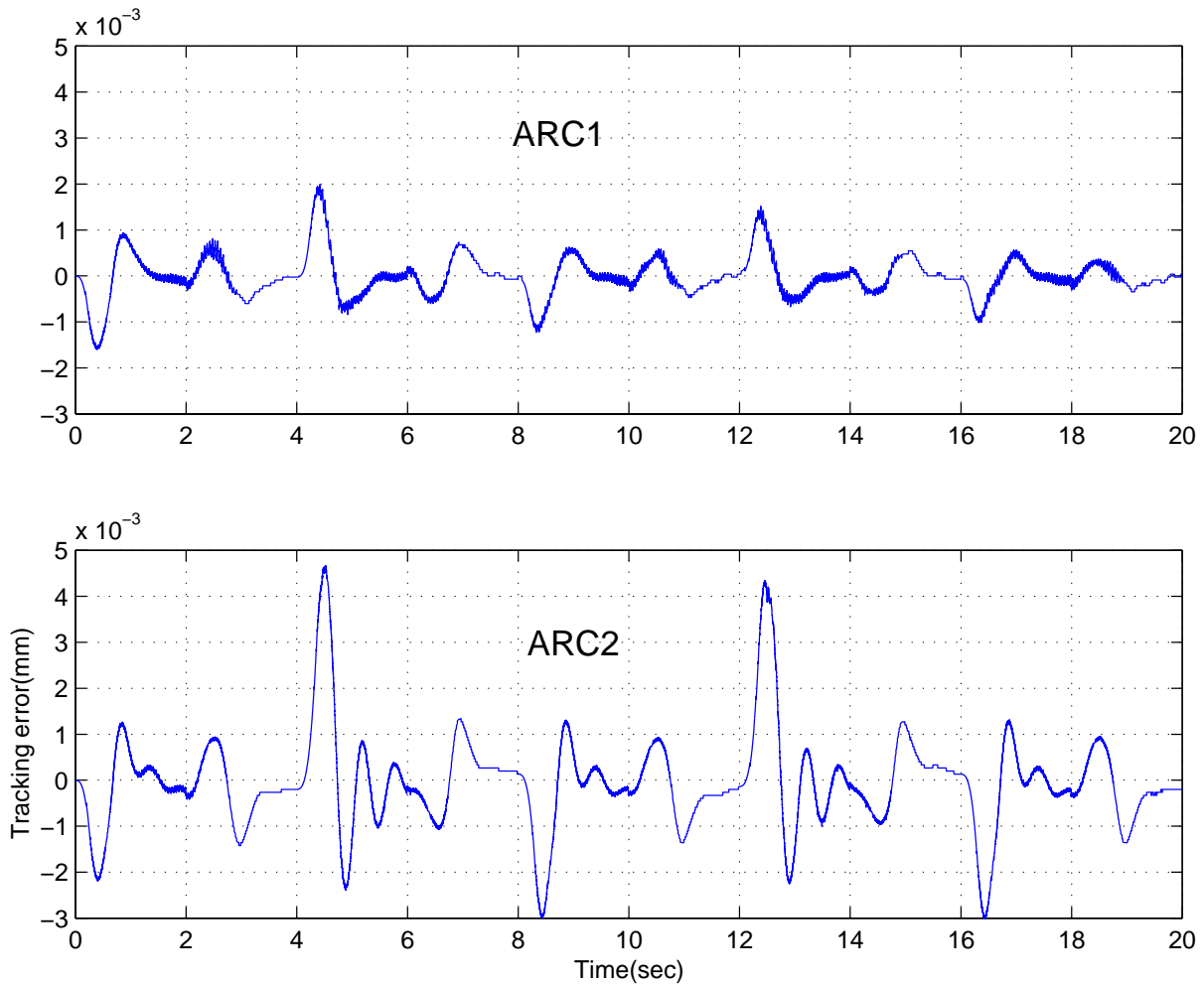


Figure 2: Tracking Errors in back-and-forward point-to-point motion with 45kg load

Comments:

To further illustrate the effectiveness of the time-varying inertia compensation and adaptation, the experiment is run for tracking a back-and-forward point-to-point desired trajectory with a payload of 45kg. As seen, since ARC1 uses time-varying inertia compensation and adapts the constant unknown payload, the tracking error reduces gradually as the parameter estimation picks up the right value as shown below.

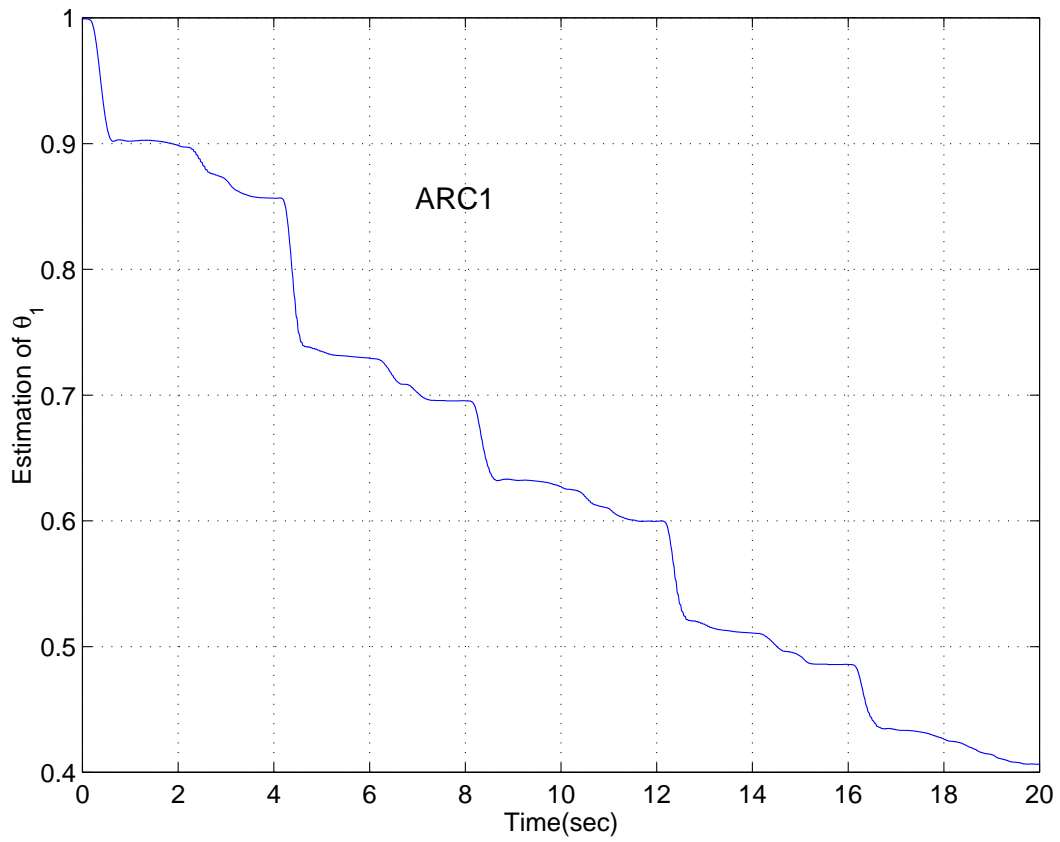


Figure 3: Parameter estimation in back-and-forward point-to-point motion with 45kg load

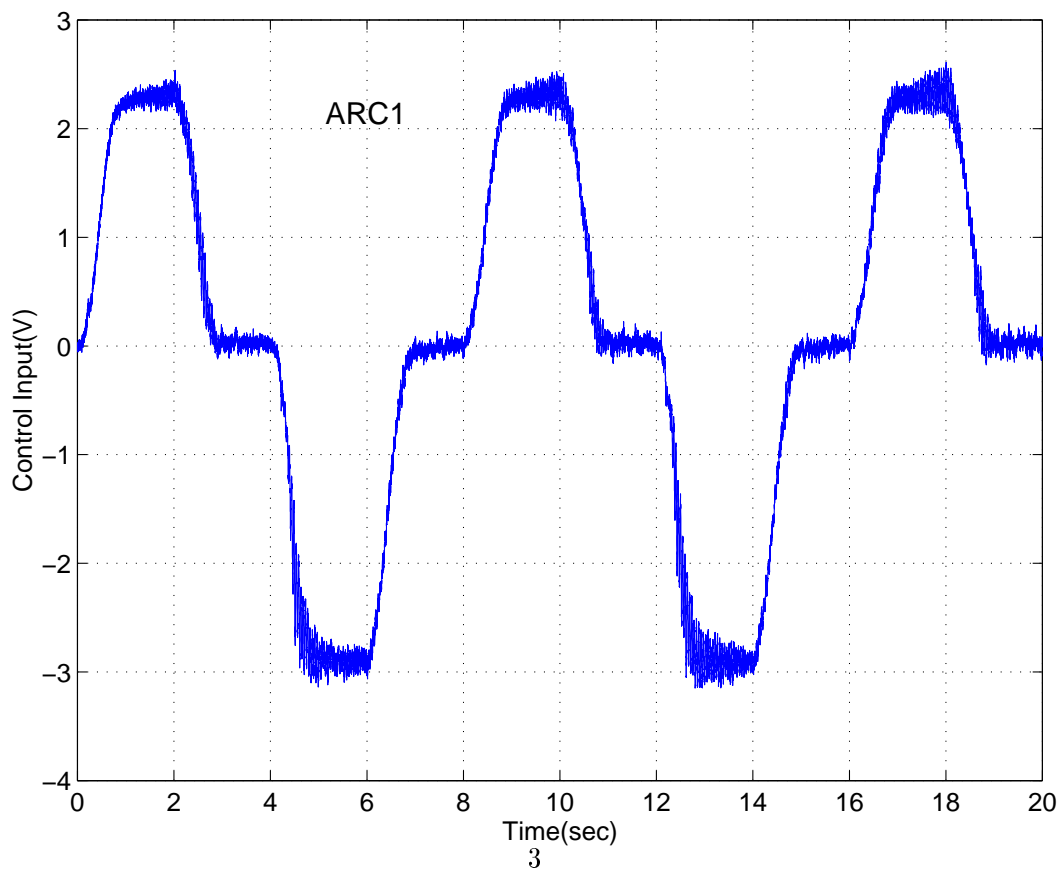


Figure 4: Control input in back-and-forward point-to-point motion with 45kg load