Online Optimization with  $b_k = sine^2-sine$  and constant Hessian  $10^{1}$  $10^{-2}$ **Tracking error** Online gradient 10<sup>-5</sup> Control-based Sys ID ARX Control-based Baseline  $10^{-8}$ Known b k version  $10^{-11}$  $10^{-14}$ 100 200 400 500 300 Time