



S 6. Fig. **Pattern Separation.** Dissimilarity measure in time for an observation window of length a) $T_E = 2$ s and b) $T_E = 10$ s, for two values of $\tau_\alpha = 20$ ms (black circles) and $\tau_\alpha = 2$ ms (red squares) at a fixed value of $f = 0.2$. It is clearly observed that $\tau_\alpha = 20$ ms more effectively differentiates the similar inputs in both observation windows, as seen by the larger values of dissimilarity respect to the $\tau_\alpha = 2$ ms. The initial increase of $d^f(t)$ observable for $\tau_\alpha = 20$ ms in panel (a) is probably due to the fact that the dynamics for this choice of parameters is chaotic as shown in the *Linear stability analysis* sub-section. Therefore the increase can be associated to a transient evolution towards the final attractor. Other parameters used: $\Delta T = 50$ ms, $g = 8$, $N = 400$, $K = 20$.