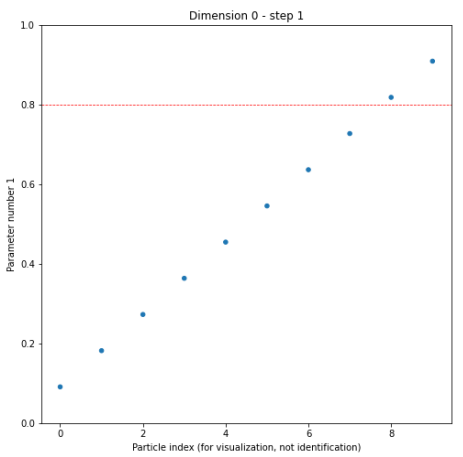
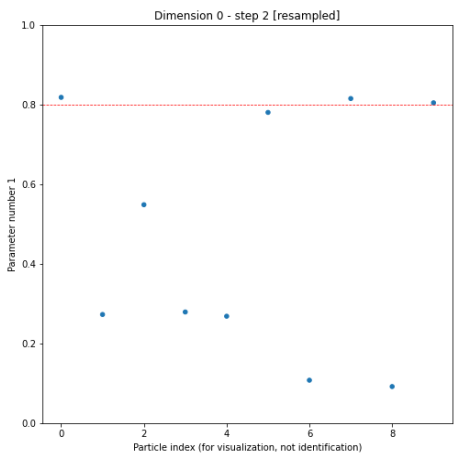
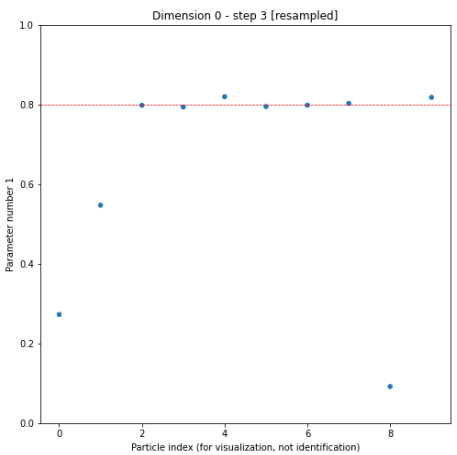
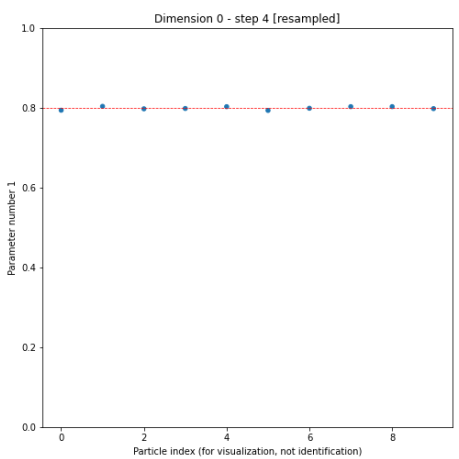
Tempered likelihood estimation

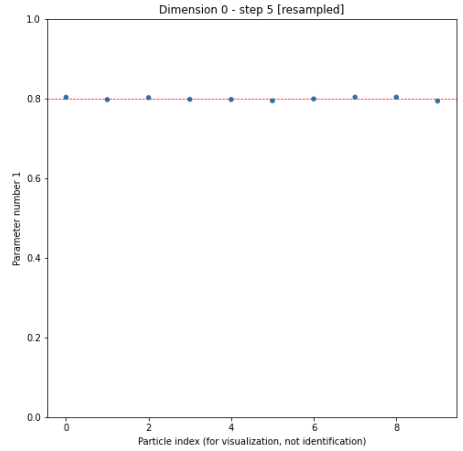
1 parameter, 1 mode (n_particles=10; N_measurements=20):











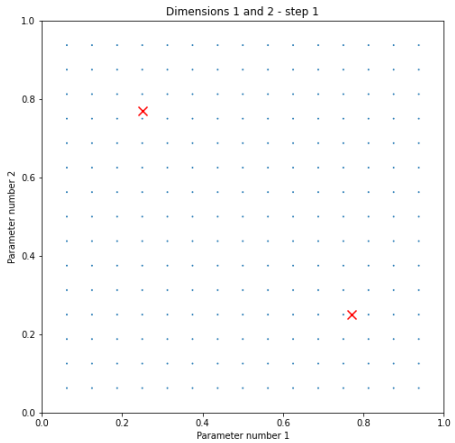
Offline estimation, random times <= 100

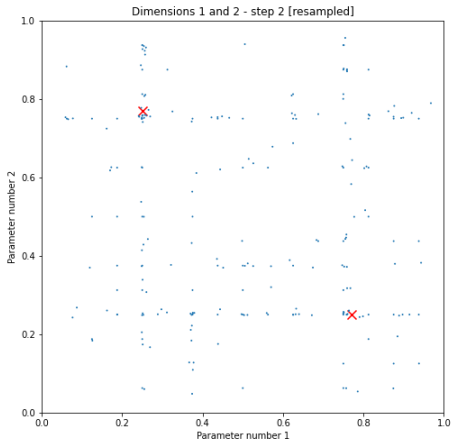
5 steps only, but full data evaluation and resampling step at each iteration (vs. as before single datum/datachunk added per step, isolated evaluation(s) for re-weighting + cumulative only if/when resampling)

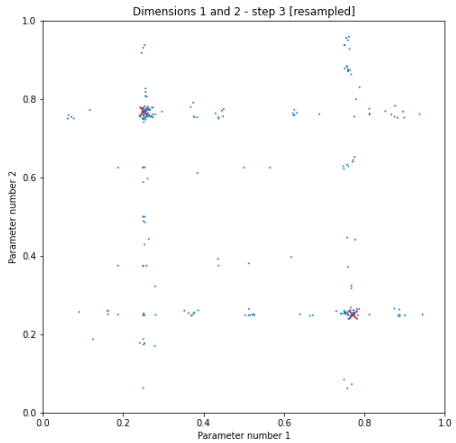
Tempering coefficients chosen offline, spaced evenly (enough to keep ESS reasonable while not requiring extra updates, though ideally chosen adaptively to stay close to target)

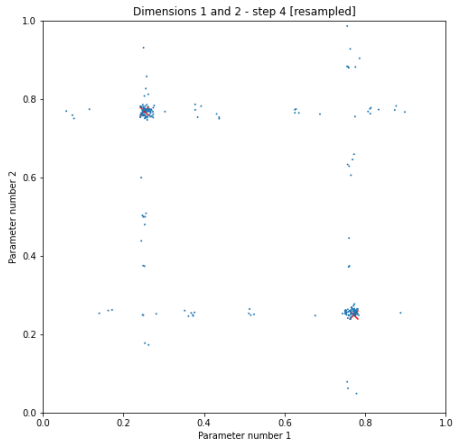
Tempered likelihood estimation

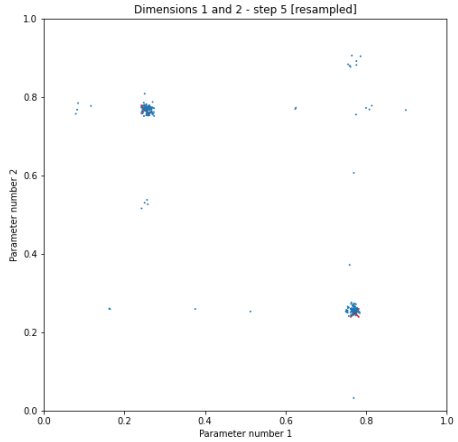
2 parameters, 2 modes (n_particles=15^2; N_measurements=100; 10 linearly spaced coefficients):

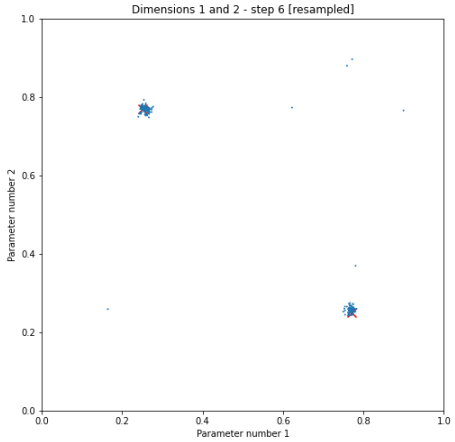


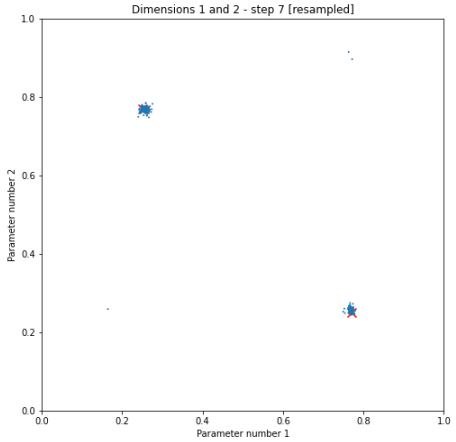


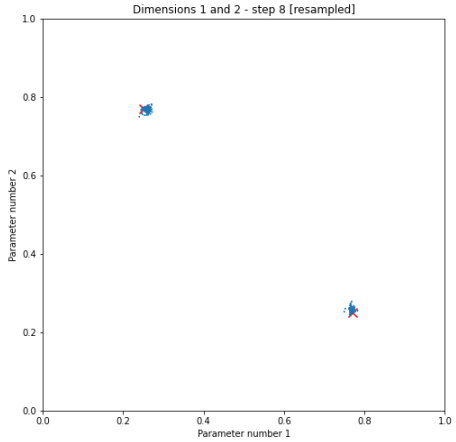


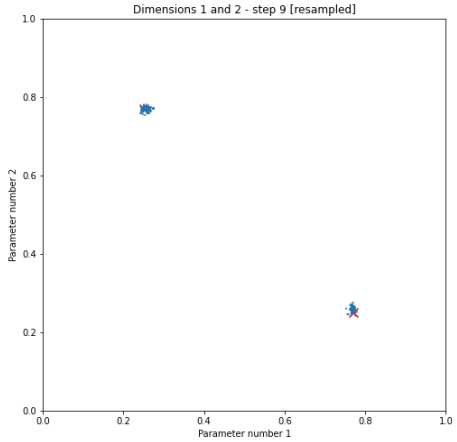


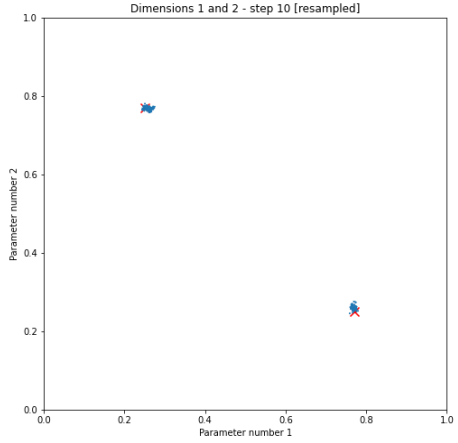






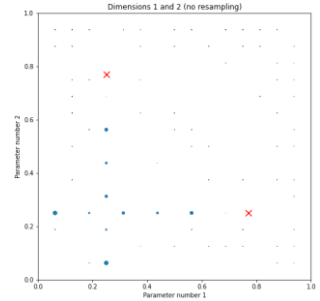




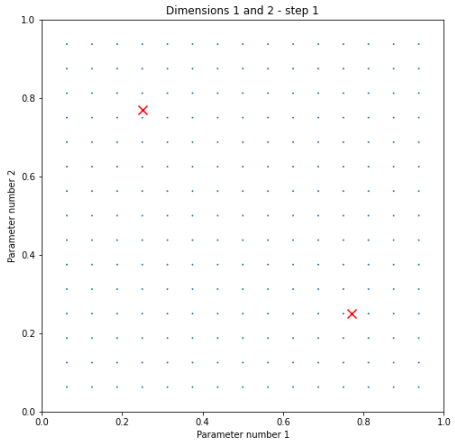


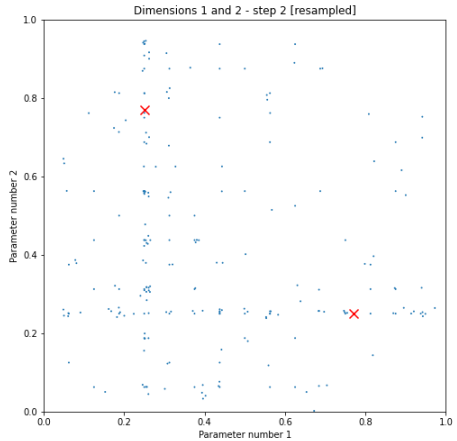
Tempered likelihood estimation

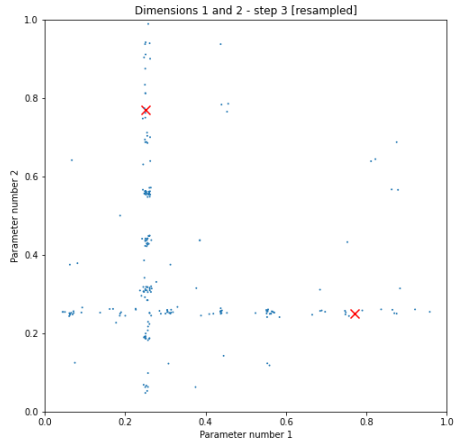
Same, but data is worse – as can be seen by no resampling, fixed lattice case

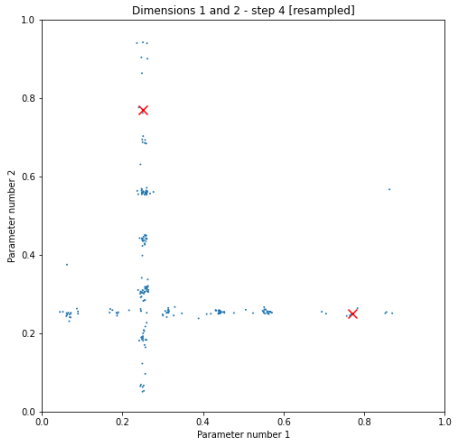


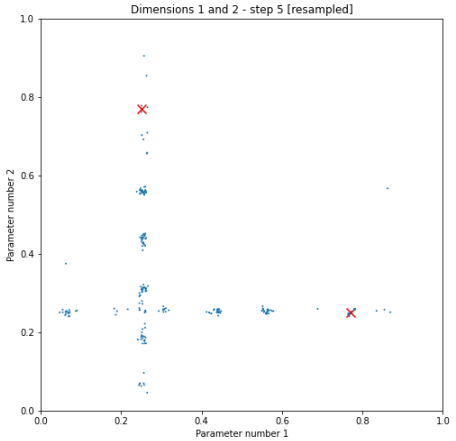
The initial grid not ‘catching’ correct modes results in early particle displacement, with near depletion at modes (recovered from in subsequent steps)

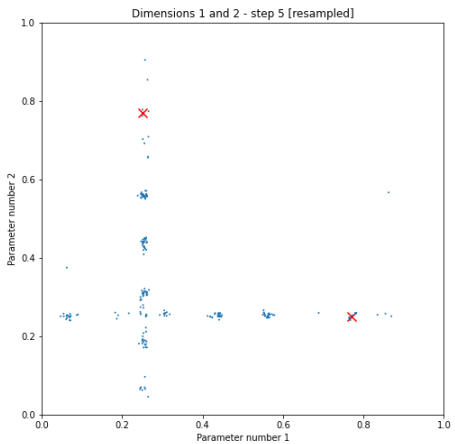


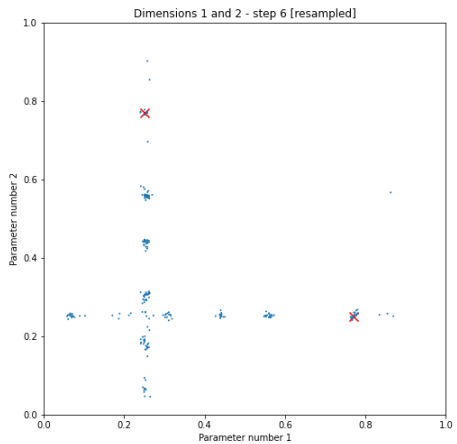


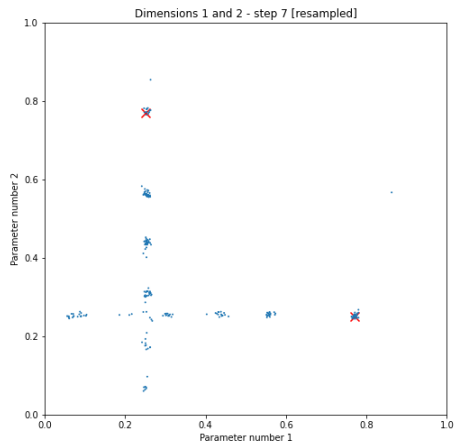


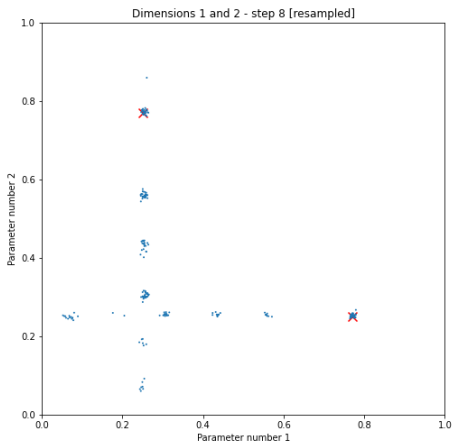


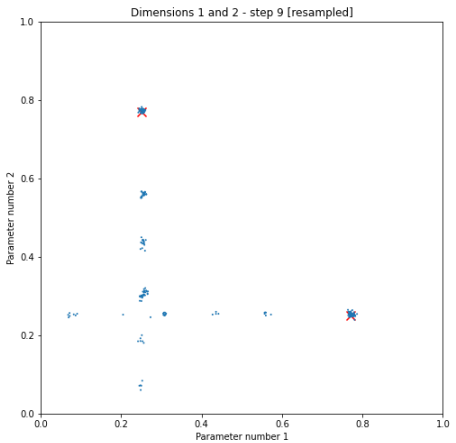






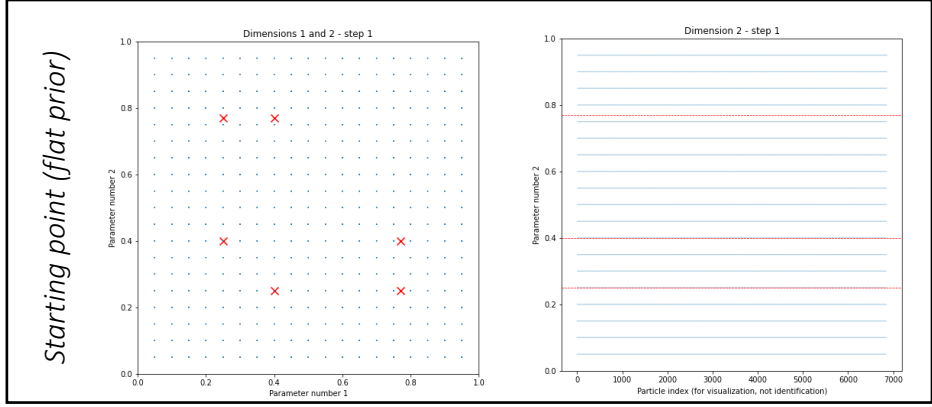


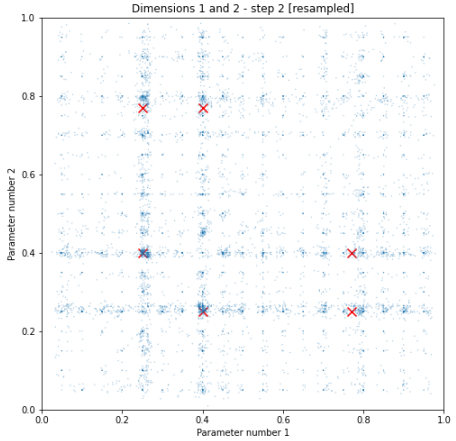


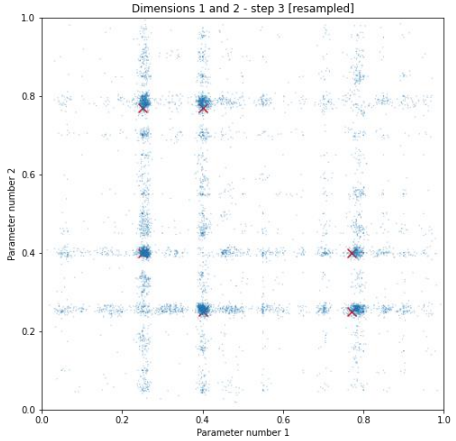


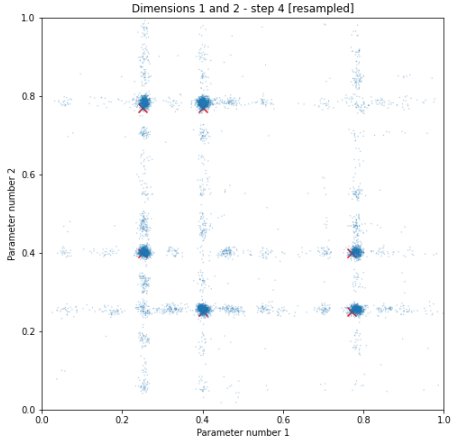
Tempered likelihood estimation

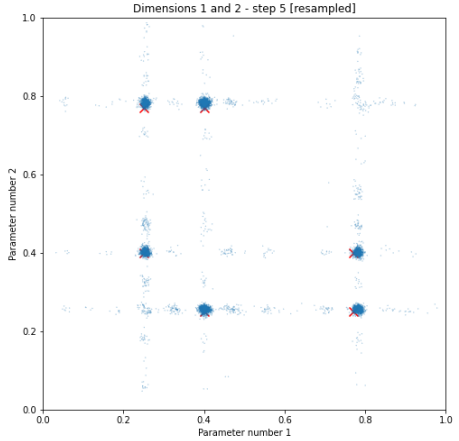
3 parameters, 6 modes (n_particles=20^3; N_measurements=200; 5 linearly spaced coefficients)
Dimensions 1 and 2 plotted together (left/top), dimension 3 alone (right/bottom)

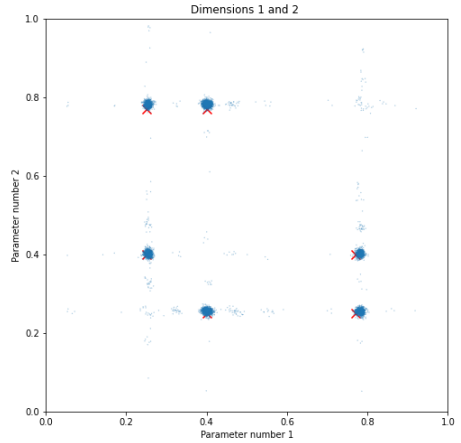


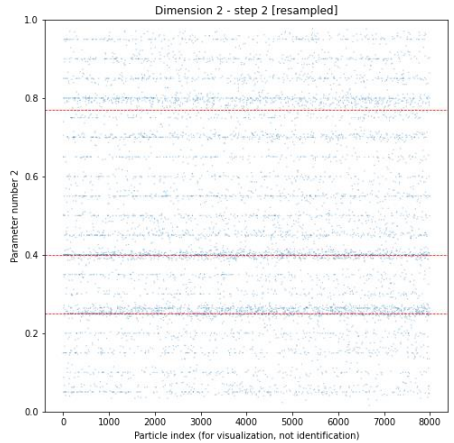


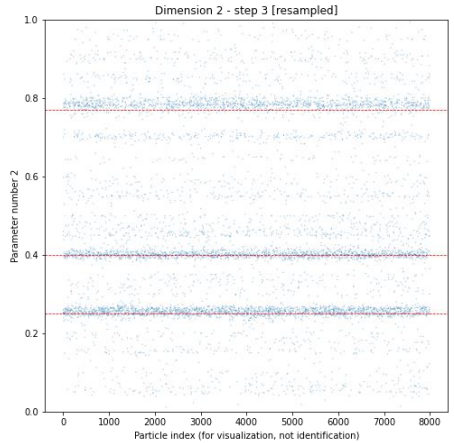


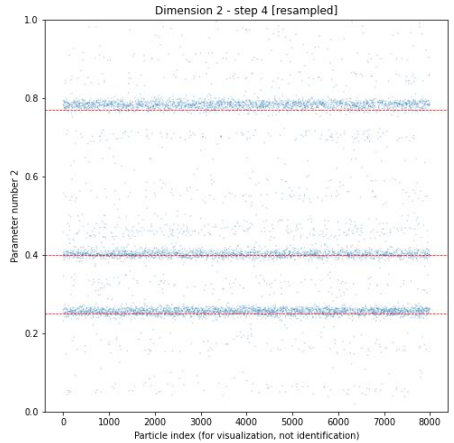


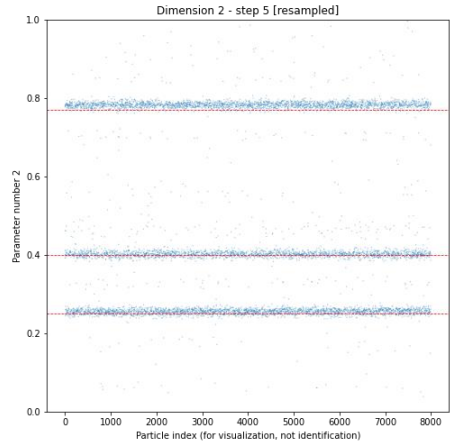


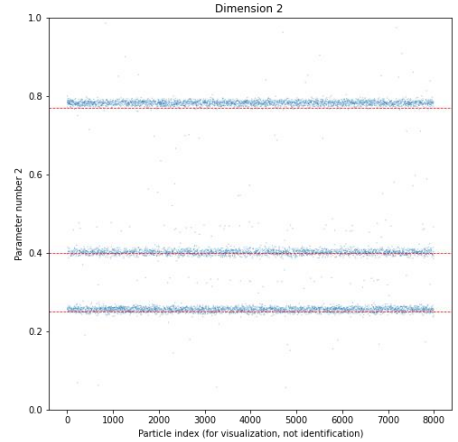












Tempered likelihood estimation

4 parameters, 24 modes (n_particles=12^4; N_measurements=250):