Fredrik's fictitious play discussion

Since the book did not have any exercises on the material covered in Lecture 11, I thought that it would be more interesting (at least for me) for us to discuss some unanswered questions I had when reading Ozdaglar's slides on Lecture 11, rather than me roaming the internet looking for suitable material. Some of these questions may be difficult to answer rigorously, in which case it is sufficient that you ponder them.

1. The theorem on slide 16 makes lots of claims, some of which are proven using (perturbed) Continuous-Time Fictitious Play (CTFP). Do the proofs for (perturbed) CTFP also hold for Discrete-Time Fictitious Play (DTFP)? Why or why not?

2. It seems like (perturbed) CTFP is preferable over DTFP, e.g. to avoid mis-coordination (also, see Question 3). However, is (perturbed) CTFP employable in practice, or is it merely a theoretical tool?

3. It is not obvious to me how to extend DTFP to games with infinite strategy spaces (without involving heuristics on how to represent the empirical frequency), but it seems like it might be straightforward for CTFP. Is it?

4. For perturbed CTFP, it seems to me that p^∞ is a Nash equilibrium if and only if for all i, $V_i(p_i^\infty)$ is very small compared to $u_i(p_i^\infty, p_{-i}^\infty)$. Is this the case? If so, is that a problem (i.e., is it hard to find a useful V)?