On the numerical approximation of minimax regret rules via fictitious play

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Given the lack of analytical solutions for minimax regret treatment rules in most scenarios of empirical interest, finding numerical approximations is of key interest. To do so, in this paper, we suggest discretizing the action space of nature and then using an algorithm based on Robinson's (1951) pioneering work on iterative solutions for two-person zero sum games with finite action space. This approach is known in the game theory literature as fictitious play and can be shown to converge to a minimax rule, see Fudenberg and Tirole (1998). As a key application we consider a policymaker who has to choose between two treatments after observing a dataset with potentially unequal sample sizes per treatment. To dramatically increase computation time we leverage the general algorithm with theoretical insights about certain symmetry conditions that can be imposed on the treatment rules. Other applications are considered, e.g. testing a status quote treatment against several innovations.