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Title: A Bayesian Framework for the Symmetric Rendezvous Problem on the Line

Significancec: A famous open problem in the field of Rendezvous Search is to ascertain the rendezvous value of the symmetric rendezvous problem on the line wherein both agents begin 2 units apart and can move at unit speed. The objective is to find a strategy that minimizes the expected meeting time of the two agents. We provide a new, Bayesian framework to both create new strategies for the agents to follow and to provide a new interpretation of previously posited strategies. Essentially, each agent calculates the probability that the other agent is in either direction, and then inputs that probability into some function that outputs the probability they should *move* in said direction. The difficulty lie in determining precisely what form the transformation function should be. Much of our work has been on trying out different functions. Preliminary results have yielded good results and provide evidence that there is potential with this method. Additionally, we have developed a method that modifies any strategy, even those with potentially infinite expected meeting time, into a new strategy that is guaranteed to have a finite expected meeting time. This process, combined with using our Bayesian framework to create new strategies, yields an upper bound that is within 1% of the current best upper bound for the symmetric rendezvous value. Finally, we re-interpret previously suggested strategies with this new framework, which sheds light on what made them successful or not. Doing so also provides a nice visual representation for these strategies as the function is easy to picture.

Student Involvement: Professor Wierman assisted in an advisory role, helping me format the paper and discuss issues I might be having.