

# AUTOMATIC ADJUSTMENT FOR LASER SYSTEMS USING A STOCHASTIC BINARY SEARCH ALGORITHM TO COPE WITH NOISY SENSING DATA

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Abstract: For laser systems, the adjustment of the optical axes is crucial. However, it is difficult for conventional methods to adjust the optical axes because they require high-precision positioning with  $\mu\text{m}$  resolutions and because laser systems have many adjustment points that have an interdependent relationship. We have proposed an automatic adjustment method using genetic algorithms to overcome this problem. However, there are still two problems that need to be solved: (1) long adjustment times, and (2) adjustment precision due to observational noise. In order to solve these problems, we propose a robust and efficient automatic adjustment method for the optical axes of laser systems using a binary search algorithm. Adjustment experiments for optical axes with 4-DOF demonstrate that the adjustment time could be reduced to half the conventional adjustment time with the genetic algorithm. Adjustment precision was enhanced by 60%.