Paper

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Scheduling and target selection optimization for exoplanet imaging spacecraft

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Abstract

Space-based extrasolar planet imaging mission performance is dependent on selection of optimal targets, integration times, and scheduling each observation. We use the WFIRST space telescopes stellar coronagraphic instrument as a baseline to compare simulated exoplanet detection yield of multiple target selection and scheduling algorithms. Using completeness as a reward metric and integration time plus overhead time as a cost metric, we simultaneously optimize the observation list and integration times. To schedule these observations, we present different dynamic planning and static planning algorithms and validate their performance in “realistic” Monte Carlo simulations using the Exoplanet Open-Source Imaging Mission Simulator (EXOSIMS) software package. We test these algorithms with completeness generated from different assumed planet populations to demonstrate robustness in deviation of the actual planet population from the planned planet population.

Citation

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