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基于非线性机会约束规划的多基雷达系统稳健功率分配算法

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Nonlinear Chance Constrained Programming Based Robust Pow for Multistatic Radar Systems

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摘要 参考文献 相关文章

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摘要 现有多基雷达系统(MSRS)功率分配算法都假设目标的雷达散射截面(RCS)信息先验已知。针对上述问题，该文将目标的RCS建模
知的随机变量，提出一种基于非线性机会约束规划(NCCP)的MSRS稳健功率分配算法，用于处理RCS参数的不确定性。该文首先推导
踪误差的贝叶斯克拉美罗界(BCRLB)。然后以最小化MSRS各个时刻发射功率为目标，在满足BCRLB不大于给定误差的概率超过某一置
条件下建立了NCCP模型，并用条件风险价值(CVaR)松弛结合抽样平均近似(SAA)算法对此问题进行了求解。最后，仿真实验验证了算
性和稳健性。

关键词： 多基雷达系统 功率分配 机会约束规划

Abstract： Almost all the existing works on power allocation assume that the target Radar Cross Section (RCS)
information is known a priori. In order to deal with the uncertainty of the target RCS, a robust power allocation a
for MultiStatic Radar Systems (MSRS) is proposed based on Nonlinear Chance Constrained Programming (NCCP),
the target RCS is modeled as a random variable with unknown distribution. Firstly, the Bayesian Cramer Rao Lov
Bound (BCRLB) is derived. Then, the NCCP model is built with the objective of minimizing the total transmit powe
MSRS, while the BCRLB outage probability is enforced to be greater than a specified probability. The resulting sto
optimization issue is solved via Conditional Value at Risk (CVaR) relaxation and Sample Average Approximation (S
method. Finally, the validity and robustness of the proposed algorithm are verified with the simulation results.

Keywords： MultiStatic Radar Systems (MSRS) Power allocation Chance Constrained Programming (CCP)

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