

A new algorithm on increasing the sensitivity of microwave radiometer based on nonlinear prediction

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Currently, microwave radiometer, which has been one of the most important remote sensors in the land, ocean or atmosphere remote sensing, has played a vital role in space exploration such as the lunar exploration in China. As a passive remote sensor, microwave radiometer receives the noise resembling signals that are generated by microwave radiation while mixed with the systemic noise of the receiver. Therefore, it is the significant subject that how to improve the sensitivity of microwave radiometer that people devotes to study. And on the system noise reduction lies the key. So far, except through choosing low noise element to the receiver, there is no effective alternative to remove the influence of the systemic noise on output uncertainty of microwave radiometer. However, for the purpose of providing or inspiring solution to this problem, this paper inquires into the application of nonlinear predictive method in predication the systemic noise of microwave radiometer. As the substance of the method, neural network shows its function on reducing the systemic noise effectively by estimating and predicating it. Because neural network can improve the estimated precision when estimating the systemic noise, after the noise passes through filter, certain random characters are lost while determinacy are presented to some extent. In fact, the more narrow filter band is, the smaller predictive error will be. The results are of assistance in understanding the intrinsic quality of the systemic noise and offer a new way for improving property of microwave radiometer.