

Scene adaptive research on lidar denoising method

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As a combination of traditional radar technology and modern laser technology, lidar has the advantages of high spatial and temporal resolution, wide detection range and so on. It is an effective remote sensing tool to detect the vertical structure of the atmosphere. In practical application, the intensity of lidar echo signal decreases gradually with the increase of detection distance. Besides, due to the influence of various noises in the detection process, the echo signal at a long distance cannot obtain sufficient information. Lidar echo signal is non-linear and non-stationary, which is often accompanied by various noises. In order to filter out noise and extract valid signal information, a suitable method should be chosen for noise reduction. Some denoising methods are commonly used, such as, the Wavelet Transform (WT), the Empirical Mode Decomposition (EMD), the Variational Mode Decomposition (VMD) and their improved algorithms. Many experiments have demonstrated that these methods have significant effects on the removal of weak signal noise, and some studies have also applied these methods to the denoising experiments of lidar signals, showing that it also has a certain ability to deal with lidar signal noise. In this paper, an adaptive denoising method for lidar signals in different scenarios is selected by comparative experiment analysis. It is shown to get extraordinary denoising effect and will improve the inversion accuracy of the lidar signals.