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# Quick identification of plasma wave: improvement and implementation of the wave surveyor technique

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The wave surveyor technique is a direct multi-satellite wave identification based on an eigendecomposition of the cross spectral density matrix. In comparison with other wave identification techniques, this method extracts only the dominant mode at each frequency but is much quicker. Here, we improve the method through a singular value decomposition of the spectrum from wavelet analysis. Furthermore, we resolve a local phase ambiguity under the assumption that the wave vector is a continuous function of frequency. The distribution of eigenvalues provides quality indicators. Cluster magnetometer measurements are used to validate the improvement. This fast technique is applied to Cluster data for a statistical study. The method is also feasible for missions with less than four spacecraft, with possible applications to data from THEMIS and the forthcoming Swarm mission.