On-line automated analytical signal diagnosis in sequential injection analysis systems using artificial neural networks

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This paper describes an automated analytical system able to diagnose multivariate spectrophotometric responses, with the aim of detecting faulty responses and assigning causes to the symptoms detected. Not only does this system detect faulty spectra, but it is also capable of modifying, by means of a "feed-back response", the entire analytical system, and, when it is necessary, to report the conditions of the sequential injection analysis system to give an on-line diagnosis signal. Artificial neural networks (ANNs), in particular counter-propagation neural networks, have been applied to detect faults and diagnose signals obtained in a sequential injection analysis system. This strategy has been used to analyse natural water samples and, in particular, to simultaneously determine calcium and magnesium by means of spectrophotometric detection of the complex which both cations form with the reagent Arsenazo (III).

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