Direct tabu search algorithm for the fiber Bragg grating distributed strain sensing

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Abstract :

A direct tabu search (DTS) algorithm used for determining the strain profile along a fiber Bragg grating (FBG) from its reflection spectrum has been demonstrated. By combining the transfer matrix method (TMM) for calculating the reflection spectrum of an FBG and the DTS method, we obtain a new method for the distributed sensing. Direct search based strategies are used to direct a tabu search. These strategies are based on a new pattern search procedure called an adaptive pattern search (APS). In addition, the well-known Nelder–Mead (NME) algorithm is used as a local search method in the final stage of the optimization process. The numerical simulations show good agreement between the original and the reconstructed strain profiles.