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Effect of Objective Function on Sparse Sensor Placement using Greedy Method[1] KUMI NAKAI, KEIGO YAMADA, TAKAYUKI NAGATA, YUJI SAITO, TAKU NONOMURA, Tohoku University — In the present study, the objective functions based on D-optimal, A-optimal, and E-optimal criteria of optimal design are adopted to the data-driven sparse sensor selection using the greedy method. The D-, A-, and E-optimal design maximizes the determinant, minimizes the trace of inverse, and maximizes the minimum eigenvalue of the Fisher information matrix, respectively. The greedy methods based on D-, A-, and E-optimality are applied to a random sensor problem, and computational results are compared. In terms of the determinant and trace of the inverse, the sensors selected by the D-optimality objective function works better than those by A- and E-optimality. On the other hand, in terms of the minimum eigenvalue, those by A-optimality works the best and those by E-optimality works better than those by D-optimality. Furthermore, the climate datasets of the National Oceanic and Atmospheric Administration (NOAA) are reconstructed using the sensors selected by the D-, A-, and E-optimality-based greedy methods. The results indicate that the greedy method based on D-optimality is the most suitable for high accurate reconstruction with low computational cost in the case of training datasets are the same as test datasets.

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