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Optimal placement of array elements for time-reversal mirror

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In the application of time-reversal mirror (TRM) to the underwater acoustic communication, the optimal placement of the transmit/receive array can enhance the signal-to-noise ratio at the foci when a number of array elements is limited. In this presentation, the optimal location of individual elements is determined by maximizing contrast between the focal location and the area of interest using genetic algorithm. As a result of optimization, the contrast as well as the intensity at foci is increased when compared to the conventional TRM. The optimal number of array elements is also investigated based on the objective function of genetic algorithm in connection with finding optimal placement of array. Numerical examples for TRM and contrast-maximization are presented and discussed.