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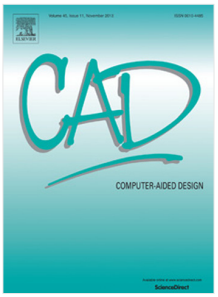

Optimizing source placement for noise minimization using hybrid acoustic simulation

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***Highlights (for review)**

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* We present an accurate and efficient hybrid sound propagation algorithm using a Linkwitz-Riley crossover filter for merging low and high frequency bands that can capture low-frequency wave effects such as diffraction while avoiding the cost of more expensive wave-based simulations.
* Source clustering of nearby sources is used to reduce the optimization search space between 2.5 and 8 times, which is necessary for efficient computations on scenes with a large degree of freedom for placement of sound sources.
* We introduce an efficient discrete optimization method for optimizing source placement that uses impulse response caching to improve convergence, reducing the effective algorithmic complexity of the heuristic optimization algorithm from worst-case O(m!) to O(m).

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