WATER RESOURCES MANAGEMENT

Self-Adaptive Solution-Space Reduction Algorithm for Multi-Objective Evolutionary Design Optimization of Water Distribution Networks

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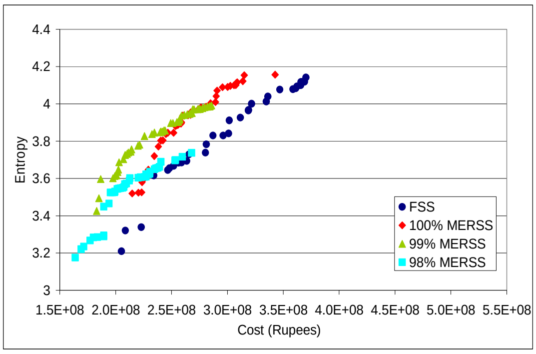
SUPPLEMATARY DATA

Pareto-Optimal Fronts of the Individual Optimization Runs

The initial populations used in the four solution scenarios were identical. Thus, the four Pareto-optimal fronts in each chart had the same initial population. The Pareto-optimal fronts for the 50 independent optimization runs revealed that, in general, the new methodology with solution-space reduction achieved superior results compared to the conventional solution approach with the full solution space. It was also evident that the conventional approach with the full solution space provided more solutions with high entropies and high costs than the reduced solution spaces.

The four solution scenarios were as follows: (a) Full solution space with entropy maximization (FSS) (full solution space); (b) Reduced solution space with entropy maximization (100% MERSS) (maximum entropy reduced solution space); (c) Reduced solution space based on 99% of the maximum entropy value (99% MERSS); and (d) Reduced solution space based on 98% of the maximum entropy value (98% MERSS). FSS and MERSS stand for full solution space and maximum entropy reduced solution space, respectively.



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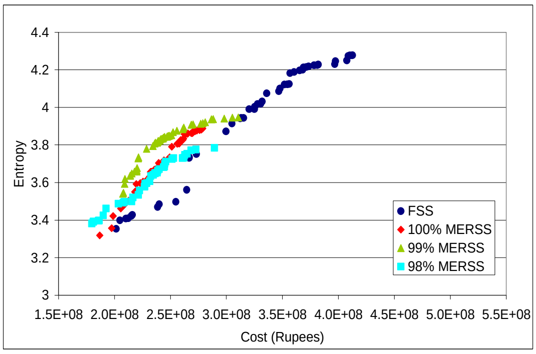

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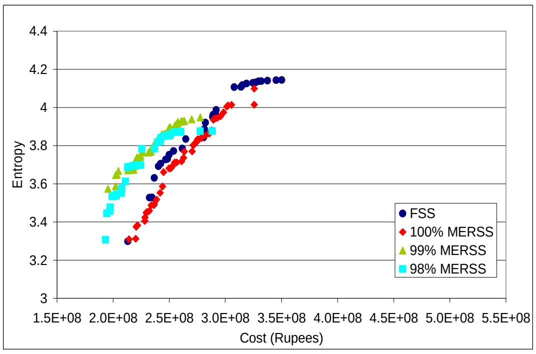

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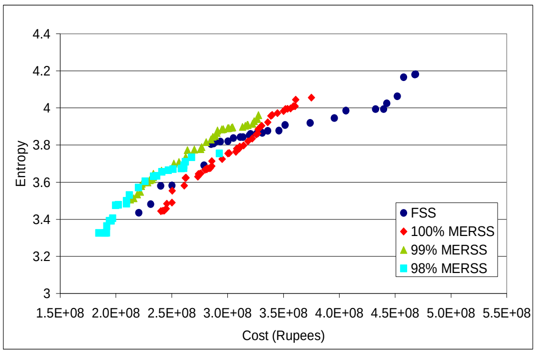

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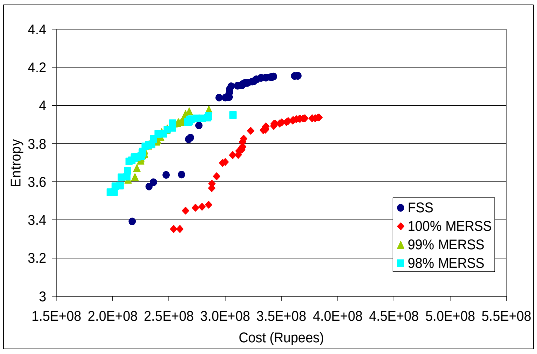

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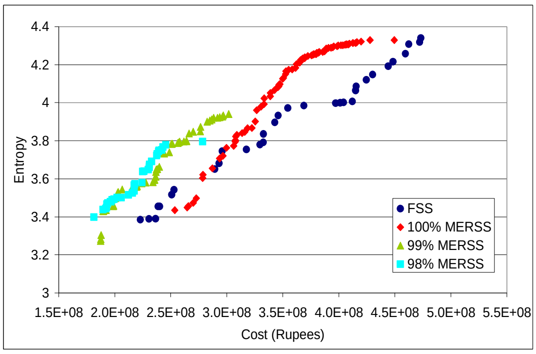

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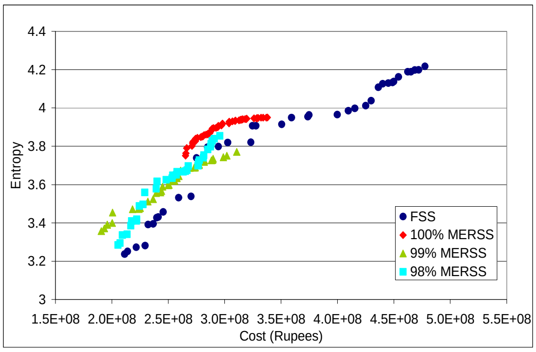

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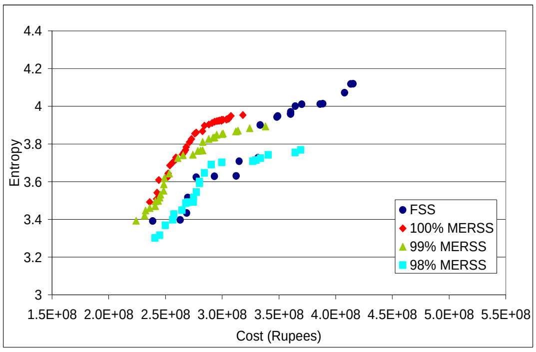

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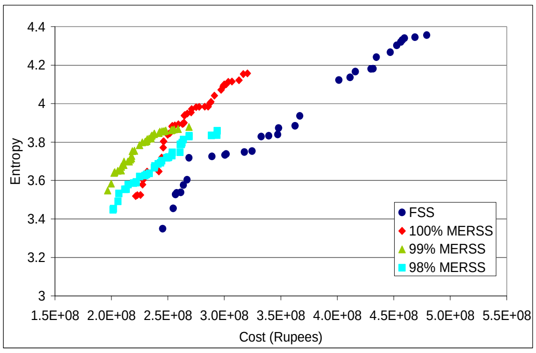

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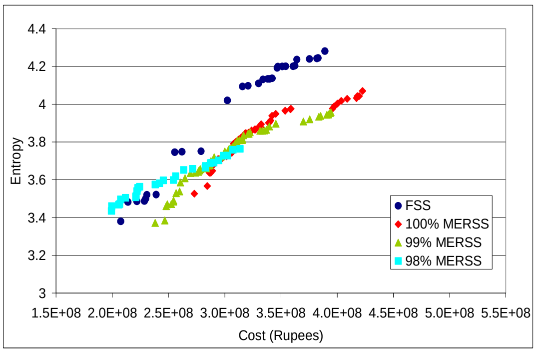

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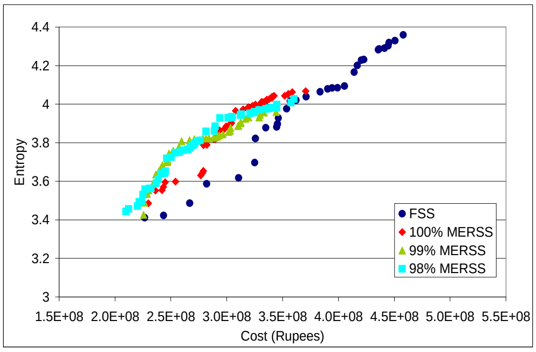

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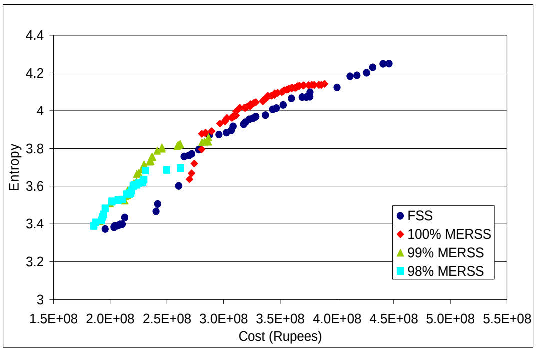

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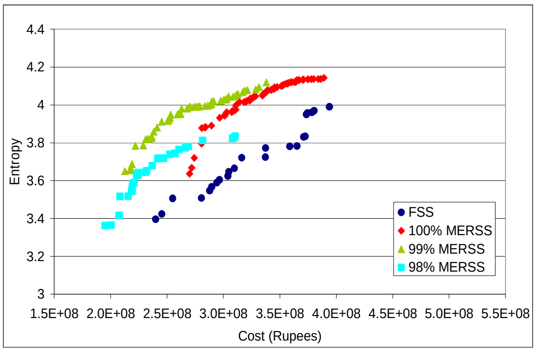

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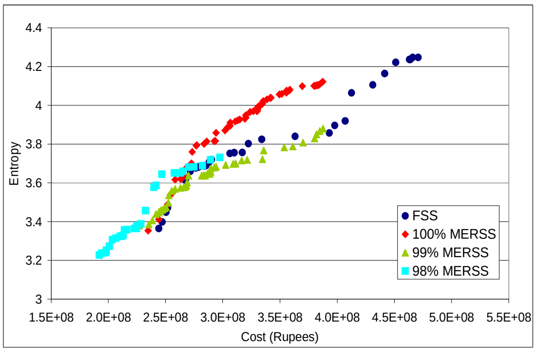

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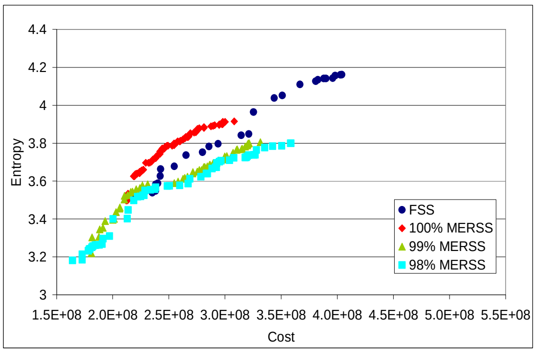

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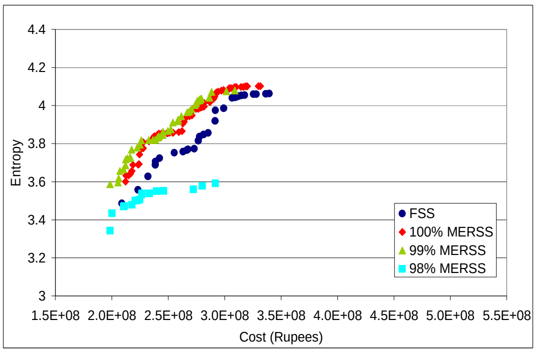

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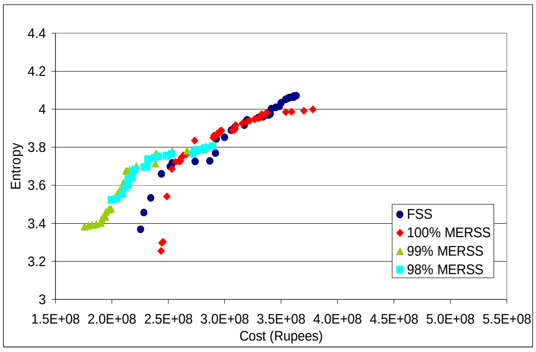

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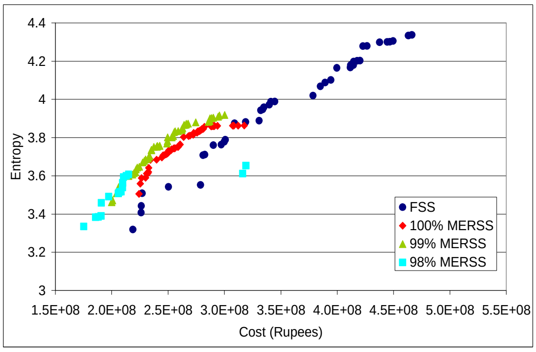

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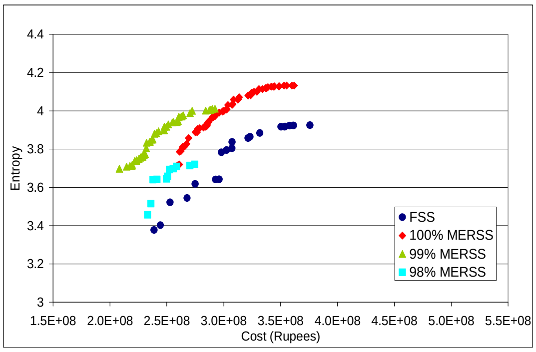

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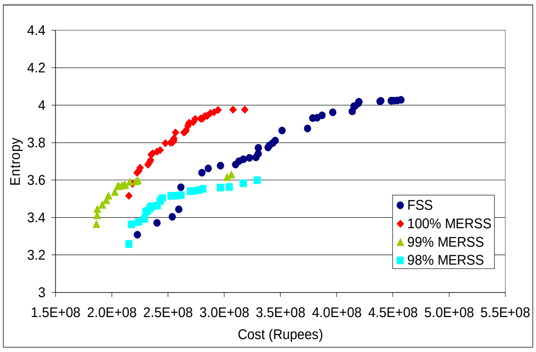

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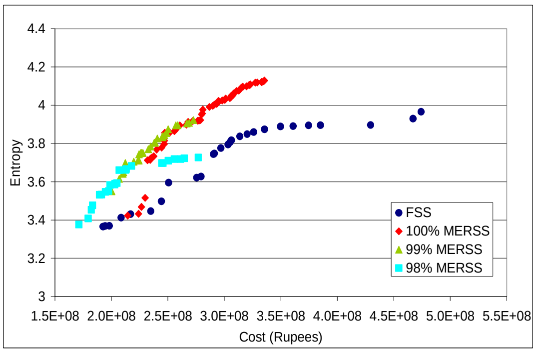

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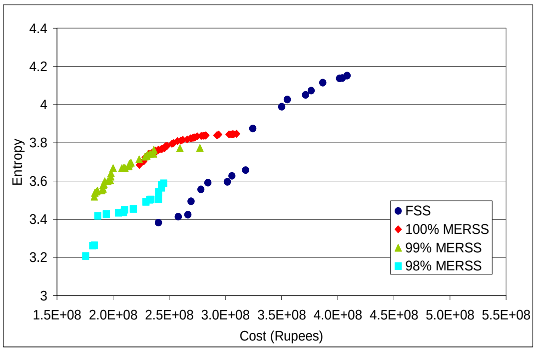

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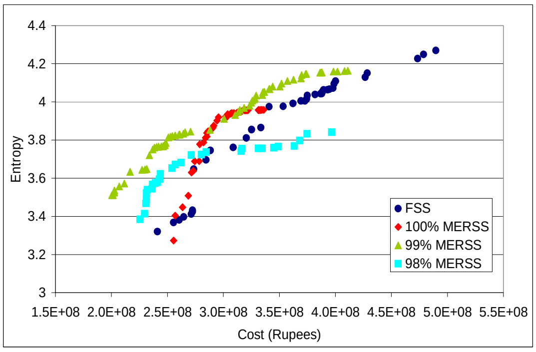

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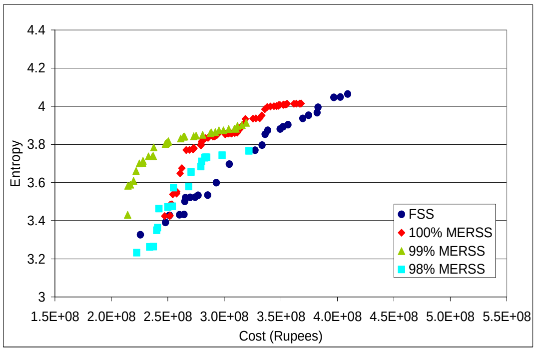

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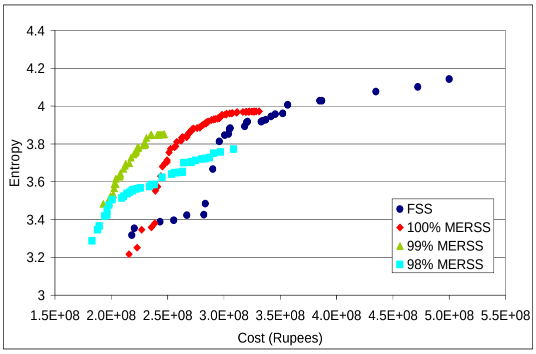

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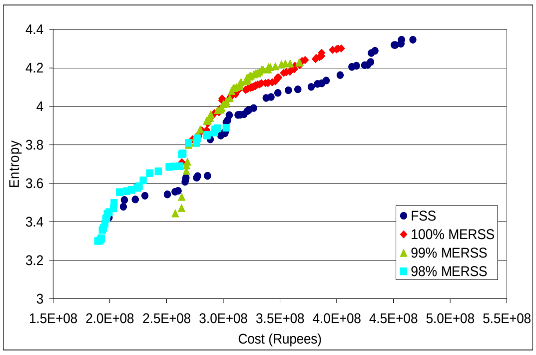

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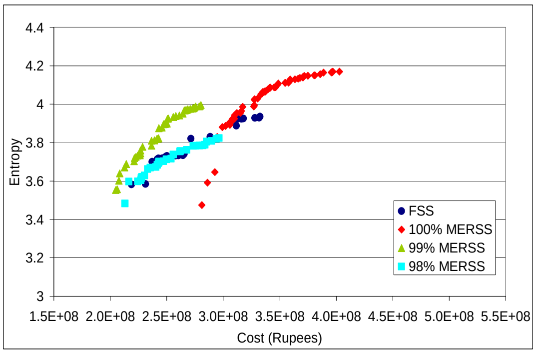

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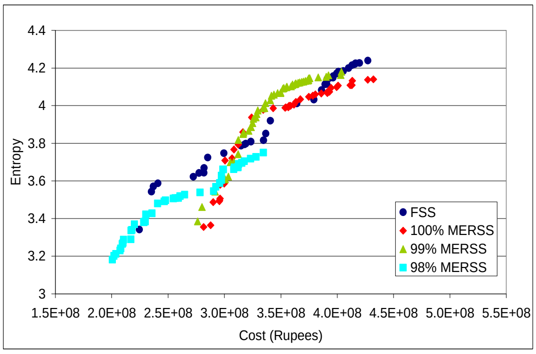

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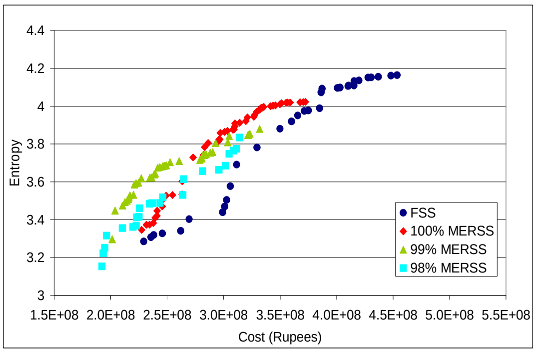

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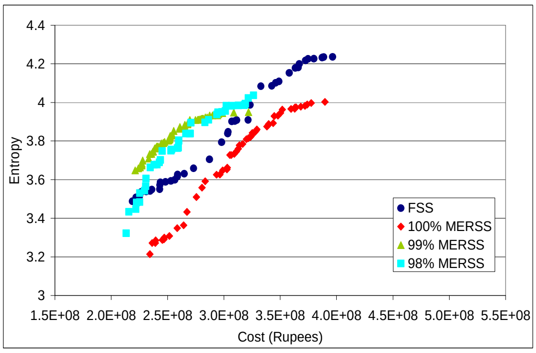

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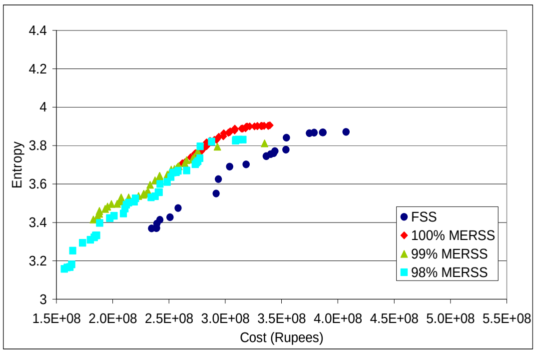

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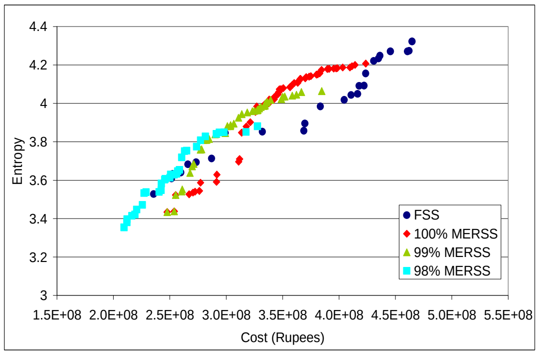

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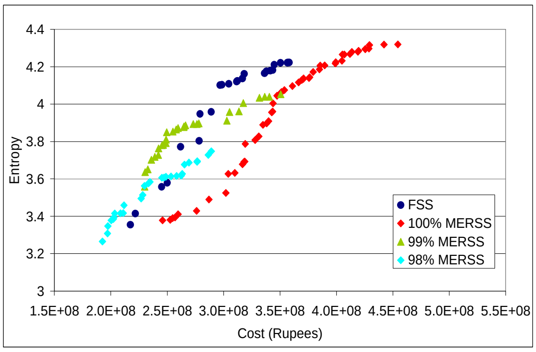

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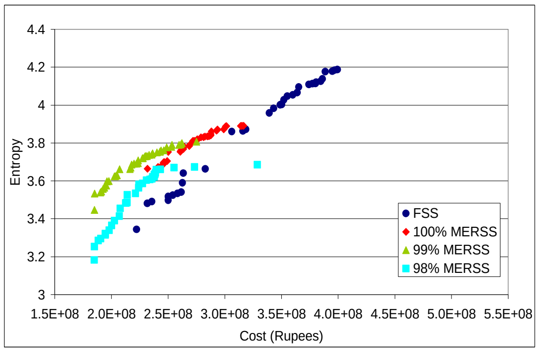

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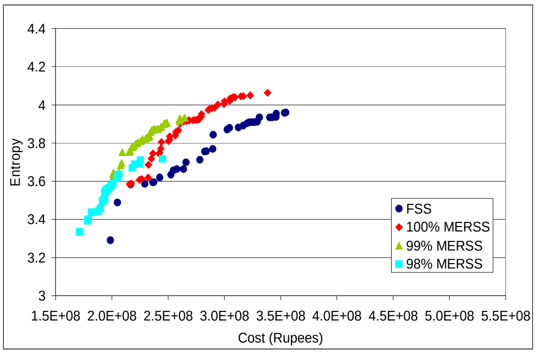

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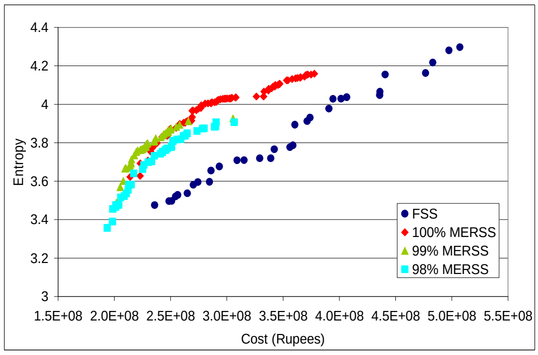

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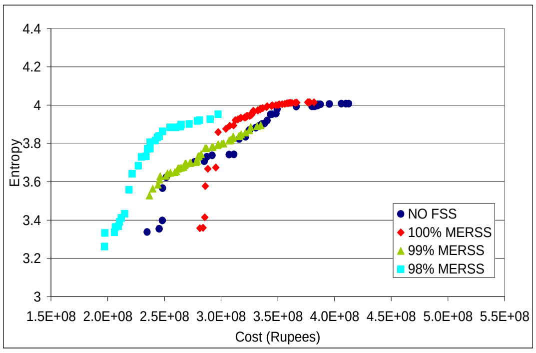

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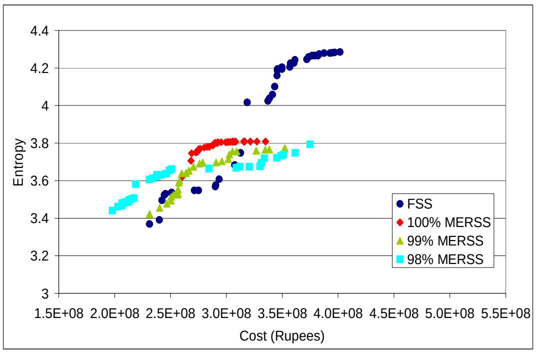

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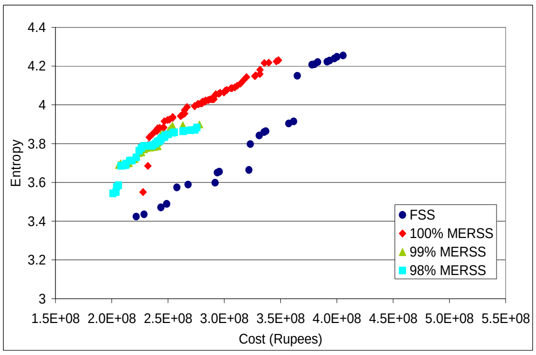

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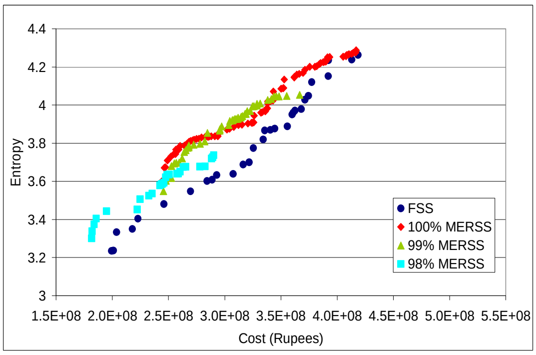

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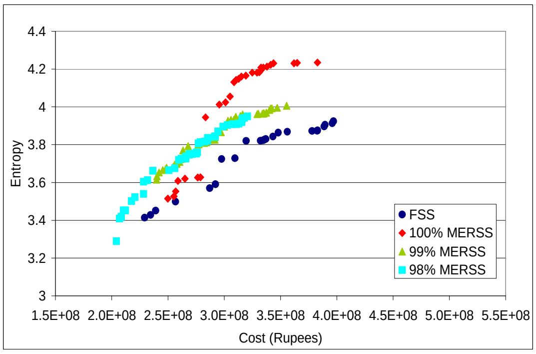

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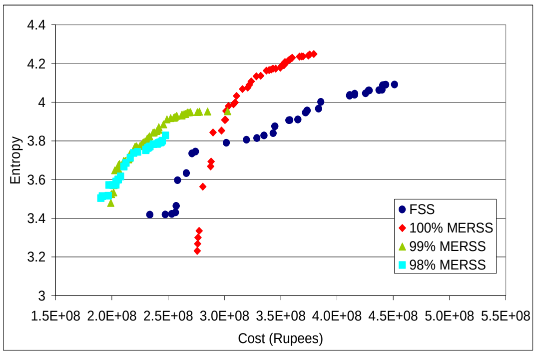

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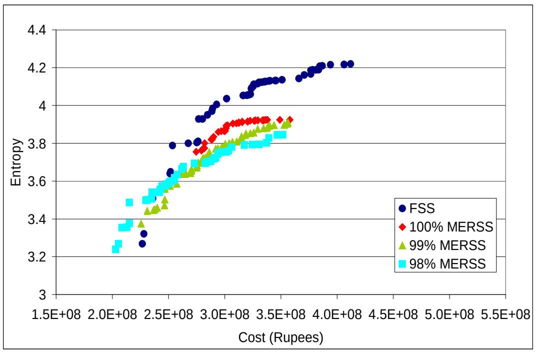

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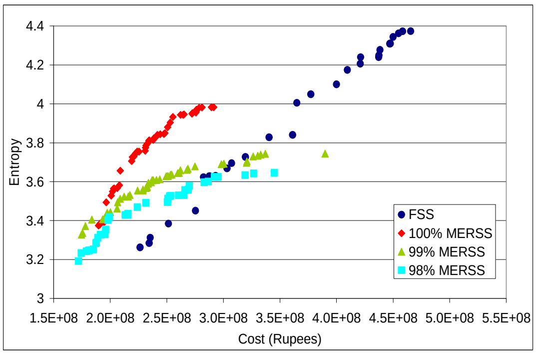

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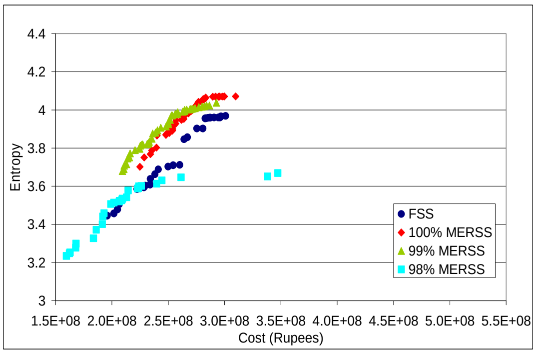

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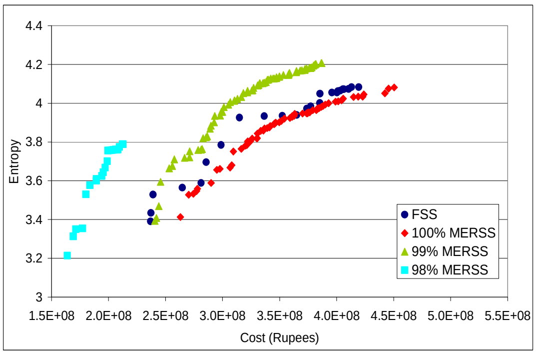

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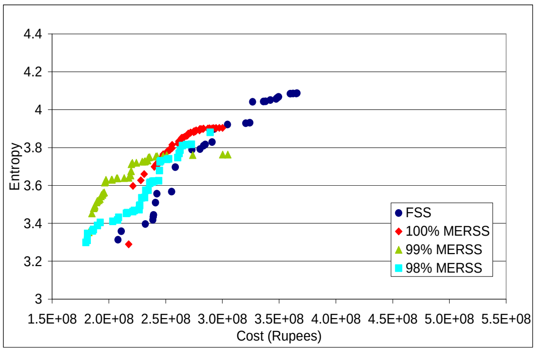

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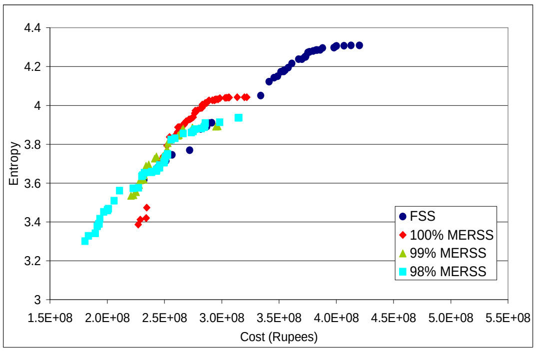

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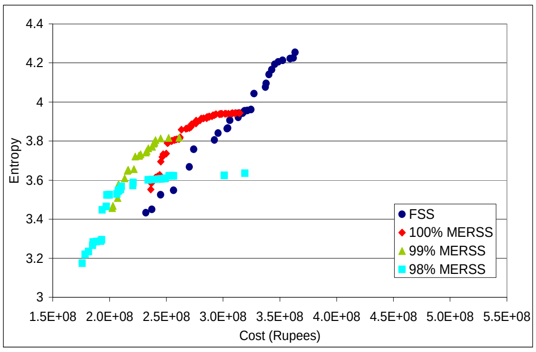

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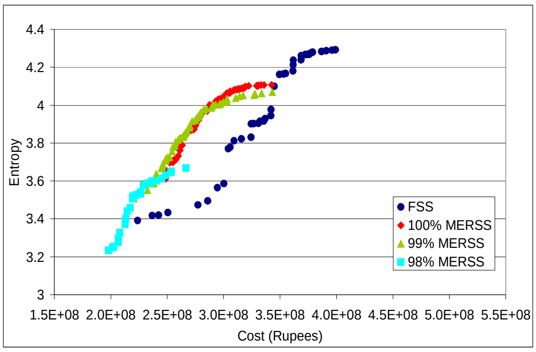

Run 50

Figure A1 Pareto-optimal fronts of the independent optimization runs