First-passage-based Last-passage Algorithm for Charge Density on a Conducting Surface

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According to probabilistic potential theory, first- and last-passage algorithms have been developed. Usually the first-passage algorithms with an enclosing sphere are used for overall charge distribution on a closed conducting object and last-passage algorithms for charge density at a specific point on the conducting object. The first- and last-passage algorithms are inherently connected. In this paper, we combine the first- and last-passage algorithms. We develop an algorithm for computing charge density at a specific point on the conducting object via the overall charge density distribution on a conducting object which is the simulation result of the first-passage algorithm with an enclosing sphere. We demonstrate the algorithm for charge density on a sphere and on the unit cube held at unit potential. The results show good agreements with theoretical or other simulation ones.

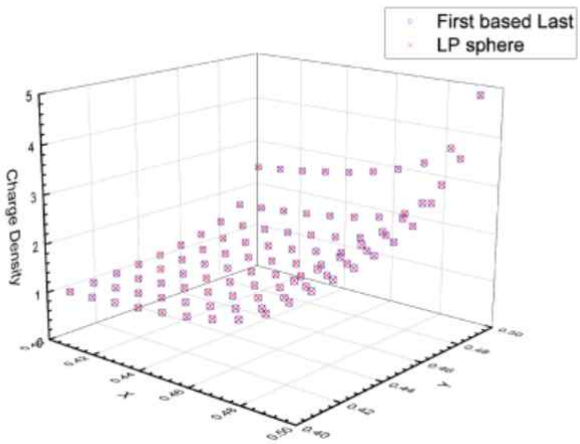

Figure 1 he charge density of the upper surface of conducting unit cube obtained by first-passage-based last-passage algorithm and last-passage algorithm. The coordinate of the vertex of the cubeis (0.5, 0.5). Charge density is Normalized by result of (0.405, 0.405).

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References

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