

EDISON

Electromagnetic Design of
flexIble SensOrs



Report 10 - Higher dimensions with EnRBM

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Revision	Date	Author(s)	Description
1.0	22.08.2017		created

1. Point selection in 2-D

The parameter space is constructed with two components: ϵ_r and frequency. The structure under analysis is presented in Fig. 1.

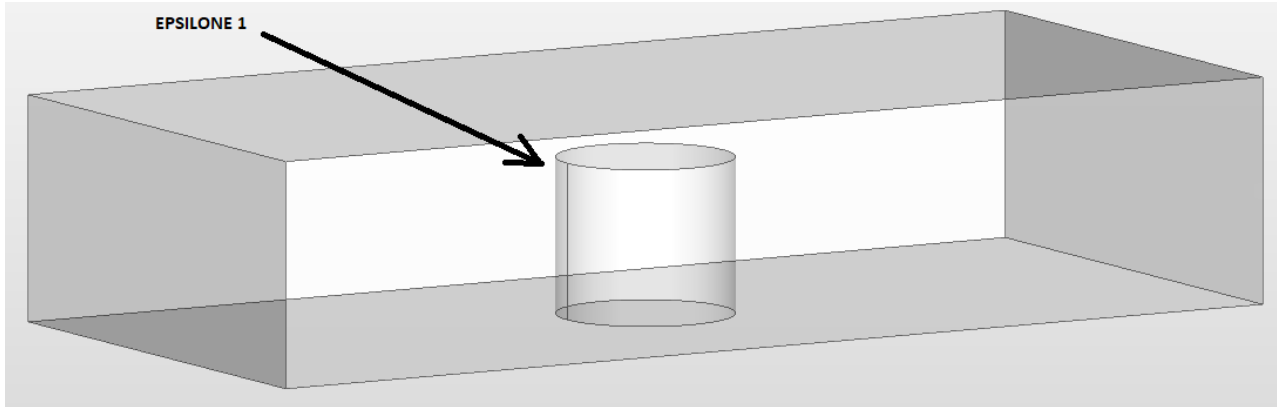


Figure 1: Analyzed structure 2-D parameter space.

The subsequent point selection scheme is presented in Figs. 2-3. In the first step the points, in which the error is below some threshold, are discarded. After that, these points are sorted in descent order and the first one is selected in the new set of points. The subsequent points are checked and if it is located outside circle, then it is accepted, and when it is inside, it is rejected. The blue circles are selected points with maximum value of error. The circles indicates the restricted area in which the next points cannot be located. The red crosses are the points that are below the square level and are located inside the spheres. The radius of circles is set to 25% of parameter points and give quite good results at this moment. Take into consideration, that the space grows with second power, thus the 25% sphere radius allows one to pick up to eight vectors (the maximum number of points in one iteration) in one iteration. It should be pointed that the circles can intersect. The axis correspond to the number of parameter points.

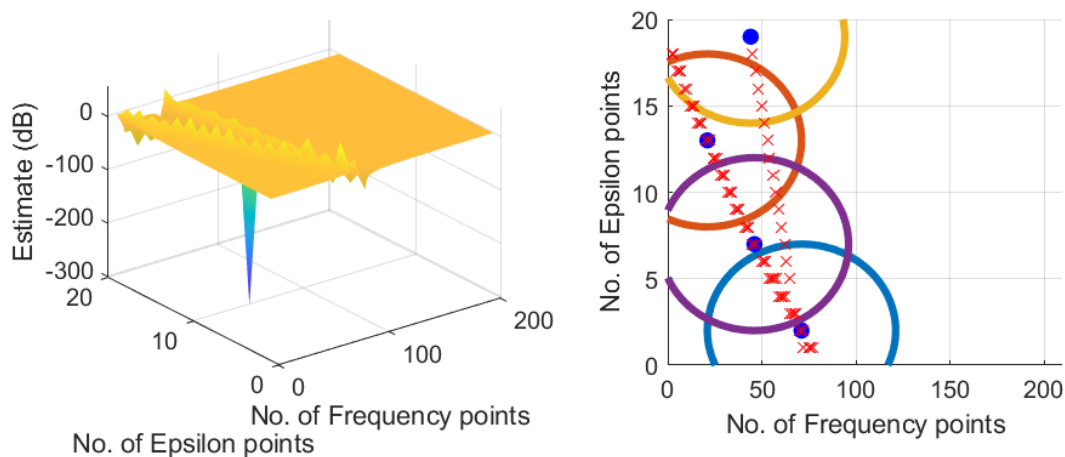


Figure 2: Algorithm 1st step.

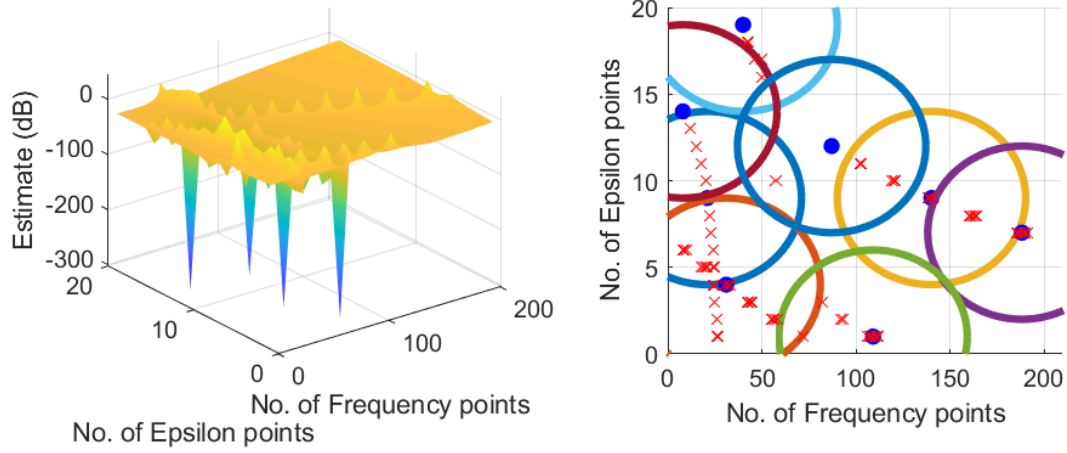


Figure 3: Algorithm 2nd step.

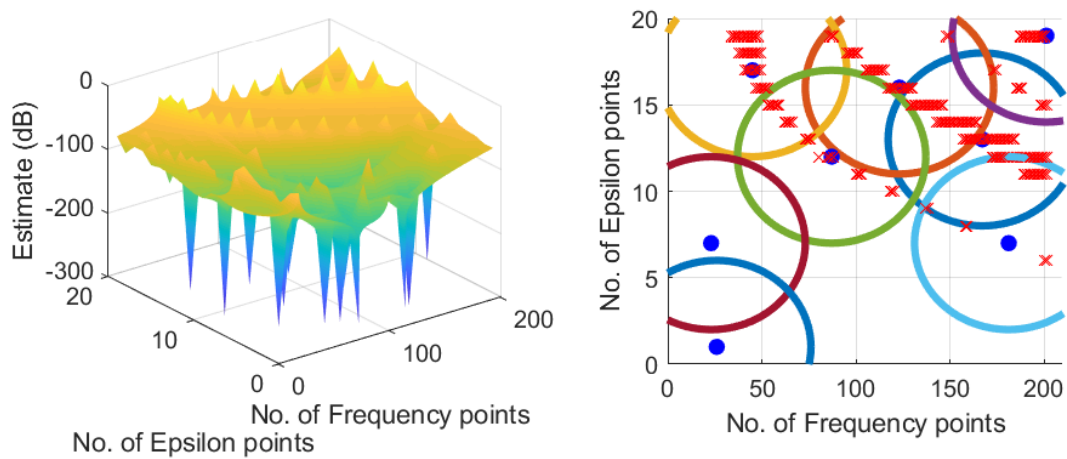


Figure 4: Algorithm 3rd step.

2. Point selection in 3-D

The parameter space is constructed with three components: ϵ_r^1 , ϵ_r^2 and frequency. The structure under analysis is presented in Fig. 5.

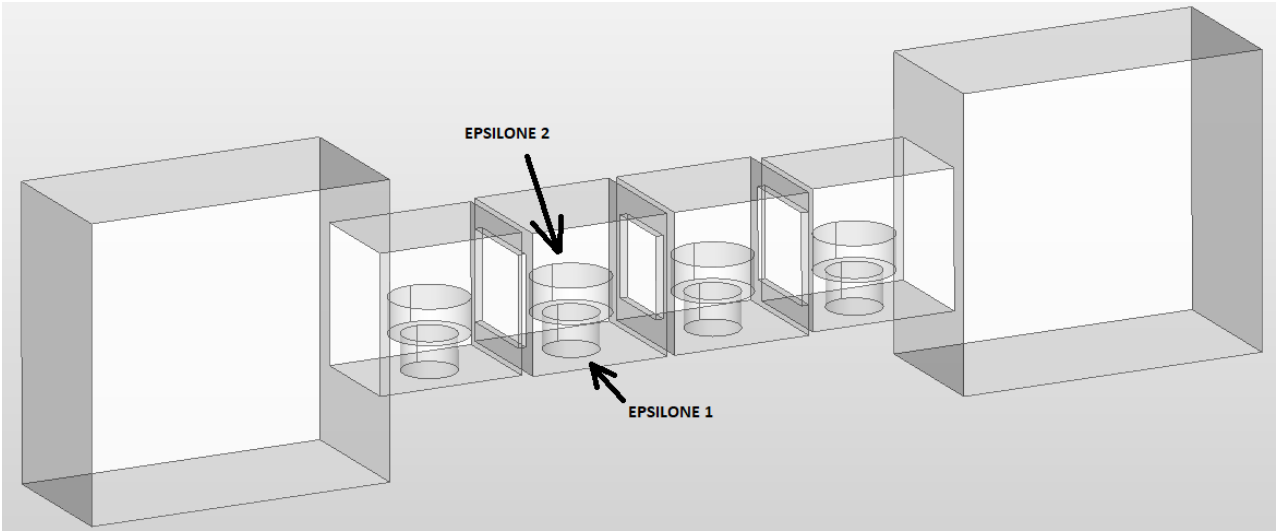


Figure 5: Analyzed structure with 3-D parameter space.

The subsequent point selection scheme is presented in Figs. 6-8. In the first step the points, in which the error is below some threshold, are discarded. After that, these points are sorted in descent order and the first one is selected in the new set of points. The subsequent points are checked and if it is located outside sphere, then it is accepted, and when it is inside, it is rejected. The blue squares are selected points with maximum value of error. The spheres indicates the restricted area in which the next points cannot be located. The red crosses are the points that are below the square level and are located inside the spheres. The radius of sphere is set to 50% of parameter points and give quite good results at this moment. Take into consideration, that the space grows with third power, thus the 50% sphere radius allows one to pick up to eight vectors (**the maximum number of points in one iteration**) in one iteration. It should be pointed that the spheres can intersect. **The axis correspond to the number of parameter points.**

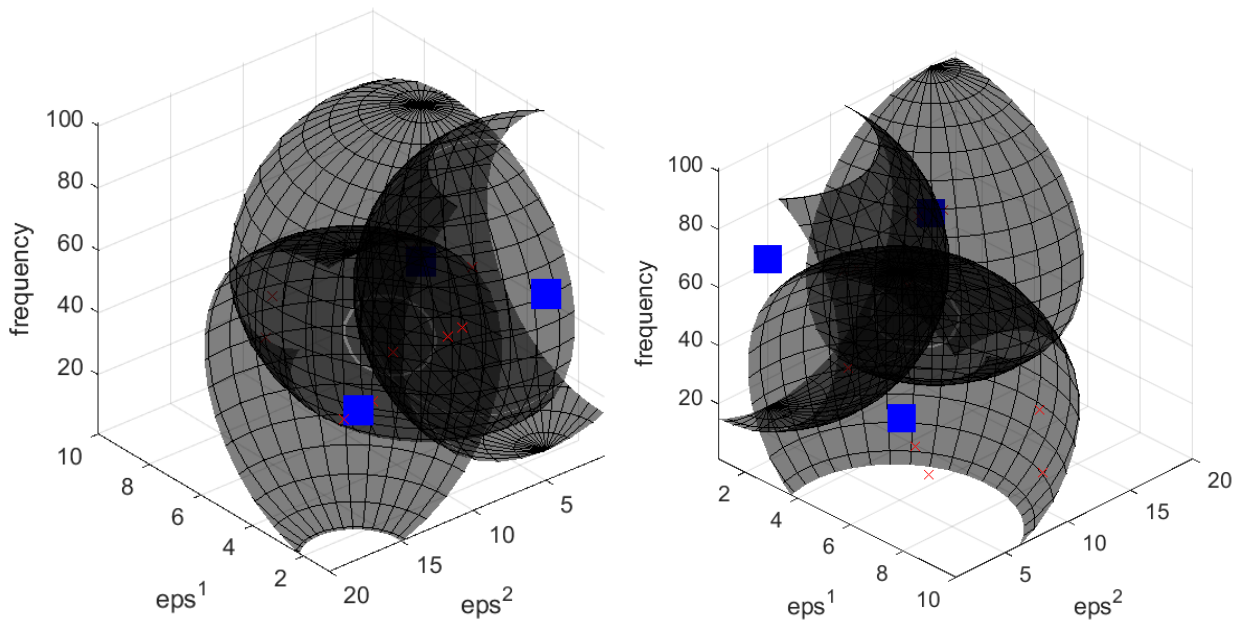


Figure 6: Algorithm 6th step.

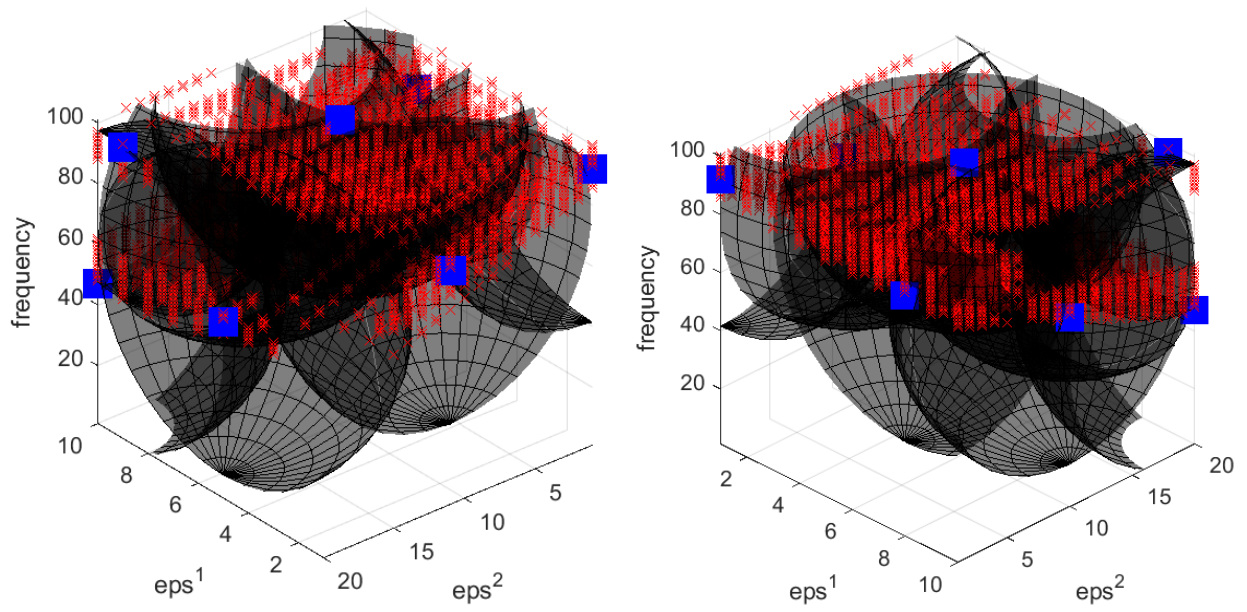


Figure 7: Algorithm 10th step.

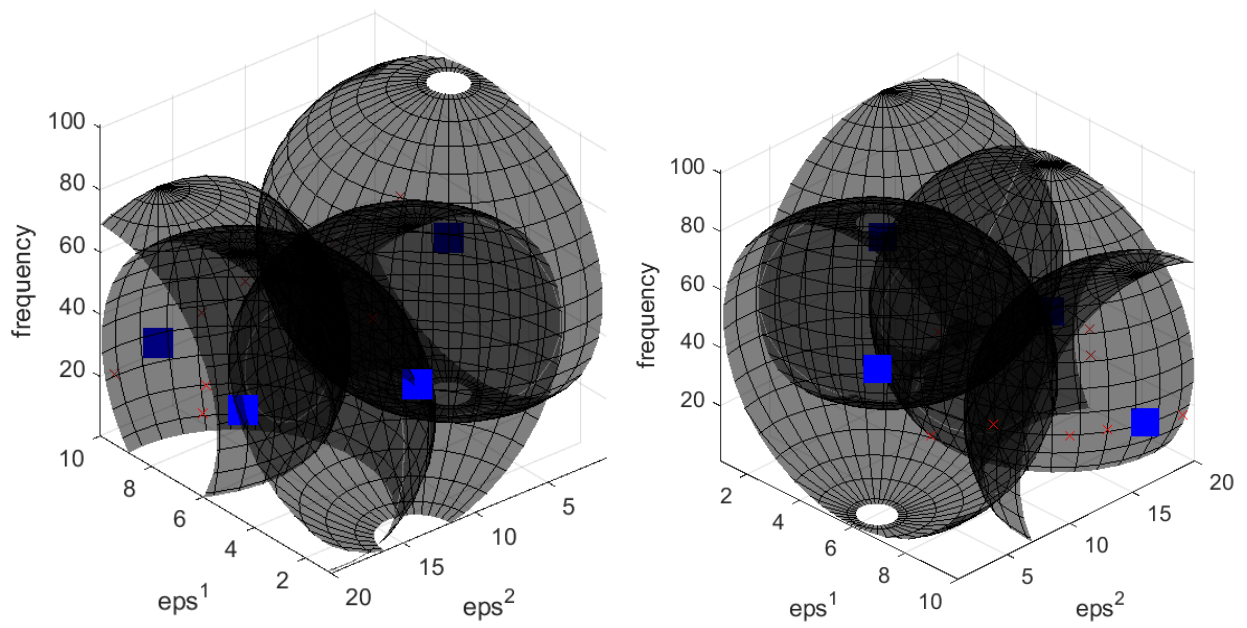


Figure 8: Algorithm 13th step.