

Divided the domain in 10x10 little square, each square has a cut. 4 possible orientations: horizontal, vertical, 2x diagonal

Run ga (genetic algorithm) with fitness function, that generates and solves the model for the given orientation-vector and returns the L^2 -norm of the von Mises stress, i.e. we want to minimize the L^2 -norm of the von Mises stress.

In this case, ga terminated after the 43th generation, because the fitness function (norm of von Mises stress) didn't improve in the last 20 generations. This was my custom stopping criteria. The L^2 -norm of the von Mises stress for the final population was: 0.3971

The genetic algorithm evaluated the fitness function 4'190 times, i.e. 4'190 orientations were generated. Thus, it most certainly didn't find a global minimum, since there are 4^{100} possible combinations.

As comparison:

Pattern	L^2 -norm of von Mises stress in MPa
Lines	0.3913
Shifted lines	0.3910
Grid	0.3894
S	0.3697
Hexagon	0.3808
Octagon	0.4145
Hilbert curve	0.4204
Sierpinski curve	0.4361
Peano curve	0.3924
Gosper curve	0.4116

Below are the different plots for the final population: cut list, model on skin, von Mises stress, 50 nodes with the highest von Mises stress.







