

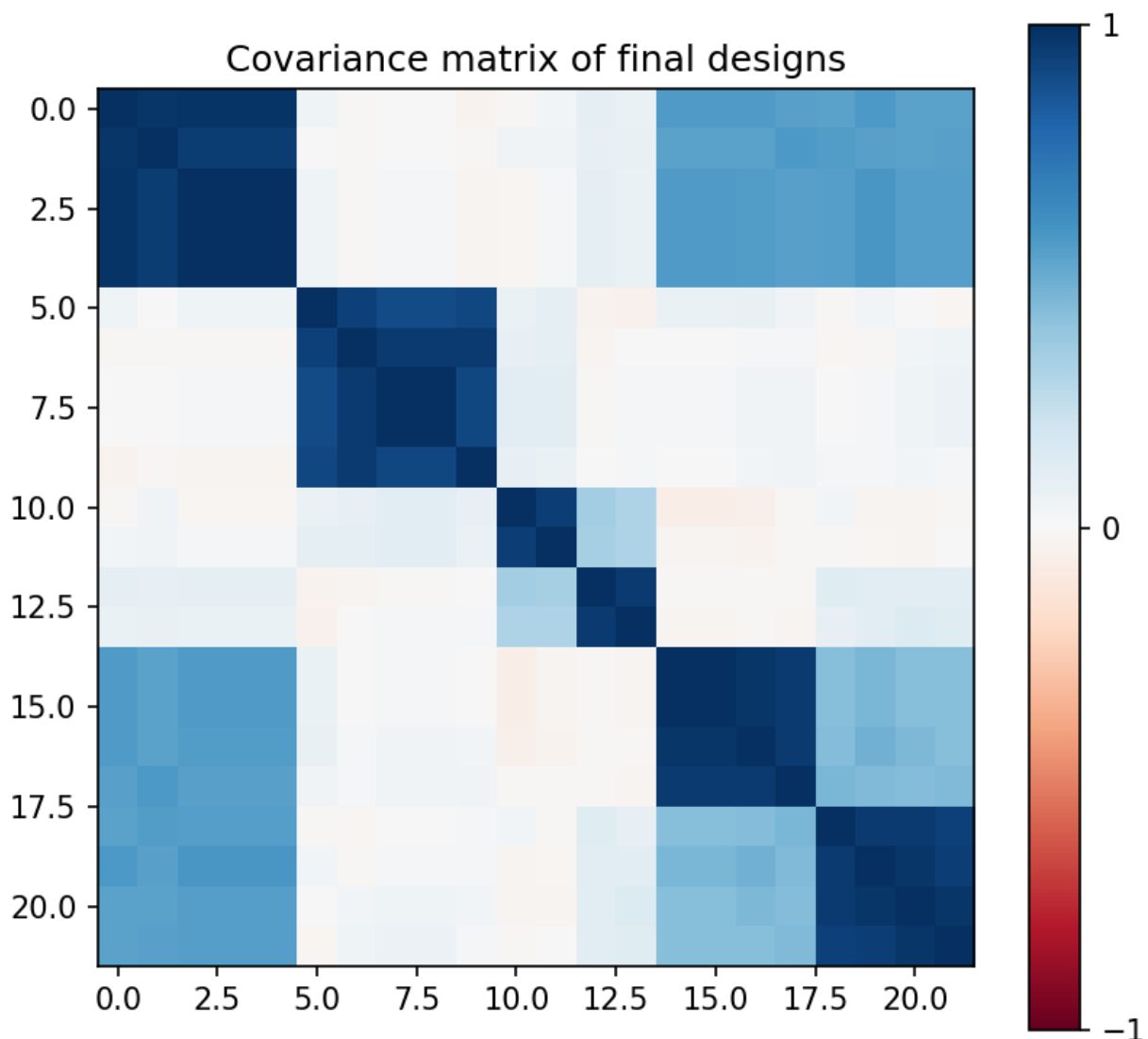


NeuroDesign: optimisation report

Document created: Fri Mar 27 18:15:49 2026

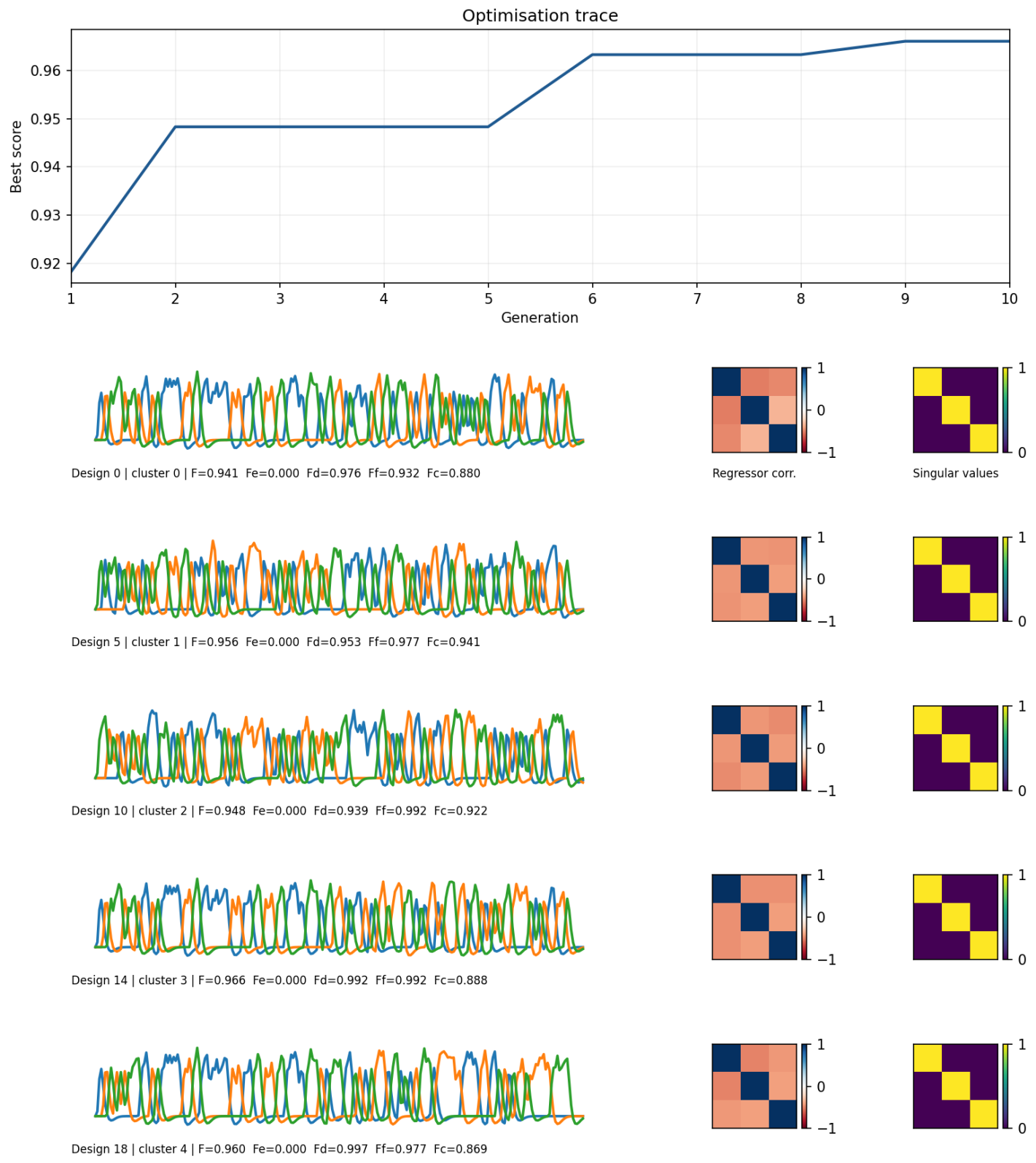
Correlation between designs

During the optimisation, the designs are mixed with each other to find better combinations. As such, the designs can look very similar. Actually, the genetic algorithm uses natural selection as a basis, and as such, the designs can be clustered in families. This is the covariance matrix between the final population of 20 designs.



Selected designs

The following figure shows in the upper panel the optimisation score over the 10 generations in the final optimisation run. Below are the expected signals of the selected representative designs from different families. The labels use the final design index after evaluation, not the generation number. Each row also reports the weighted score and the component metrics (Fe, Fd, Ff, Fc).



Experimental settings

Setting	Value
Repetition time (TR):	2
Number of trials:	100
Number of scans:	250
Number of different stimuli:	3
Stimulus probabilities:	0.33, 0.33, 0.33
Order generation:	Genetic crossover/mutation order optimisation
Order details:	No fixed order constraints
Stimulus duration mode:	Fixed stimulus duration
Stimulus duration details:	1
Base stimulus duration (s):	1
Trial container max (s):	1
Seconds before stimulus (in trial):	0
Seconds after stimulus (in trial):	2
Expected trial duration (s):	3
Total experiment duration (s):	500
Number of stimuli between rest blocks:	0
Duration of rest blocks (s):	0
Contrasts:	[[1, 0, 0], [0, 1, 0], [0, 0, 1], [1, -1, 0], [0, 1, -1]]
ITI generation:	exponential
ITI details:	min: 1, mean: 2, max: 4
Minimum ITI:	1
Mean ITI:	2
Maximum ITI:	4
Hard probabilities:	False
Maximum number of repeated stimuli:	None
Resolution of design:	0.1
Assumed autocorrelation:	0.3

Optimalisation settings

Setting	Value
Optimisation weights (Fe,Fd,Ff,Fc):	0, 0.5, 0.25, 0.25
A-optimality?	True

Number of designs in each generation: 20

Number of immigrants in each generation: 4

Confounding order: 3

Convergence criterion: 1000

Number of precycles: 10

Number of cycles: 10

Percentage of mutations: 0.01

Seed: 218001

Selected design summary

These are the representative designs shown in the figure. The final design index refers to the reordered design list after clustering.

Selection	Final design	Cluster	F	Fe	Fd	Ff	Fc
1	0	0	0.941	0.000	0.976	0.932	0.880
2	5	1	0.956	0.000	0.953	0.977	0.941
3	10	2	0.948	0.000	0.939	0.992	0.922
4	14	3	0.966	0.000	0.992	0.992	0.888
5	18	4	0.960	0.000	0.997	0.977	0.869