

Supplementary Material

Research on flow field prediction in a multi-swirl combustor using artificial neural network

Weijia Qian^a, Siheng Yang^{b*}, Weijie Liu^b, Quanhong Xu^c, Wenbin Zhu^d

^aInstitute for Energy Research, Jiangsu University, Zhenjiang 212013, China

^bSchool of Energy Engineering, Zhejiang University, Hangzhou 310013, China

^cResearch Institute of Aero-Engine, Beihang University, Beijing 100191, China

^dResearch Center for Frontier Fundamental Studies, Zhejiang Lab, Hangzhou 311121, China

Corresponding Author:

Siheng Yang

Postal address: School of Energy Engineering, Zhejiang University, 38 Zheda Road, Xihu

District, Hangzhou, 310013, China

E-mail: yangsiheng@zju.edu.cn

Table S1: Effect of input data ratio on the training performance.

Ratio of training data sets (%)	Training set RMSE	Training set R^2	Extrapolation set RMSE	Extrapolation set R^2	Training time (s)
50	1.0447	0.9792	2.3982	0.9451	51
60	1.0469	0.9792	1.5108	0.9614	55
70	1.0435	0.9793	1.5789	0.9559	57
80	0.9794	0.9819	6.9349	0.5301	66
90	0.8943	0.9849	4.8059	0.7842	68

Table S2: Effect of number of neurons on the training performance.

Neuron number	Training set RMSE	Training set R^2	Extrapolation set RMSE	Extrapolation set R^2	Training time (s)
6	1.0931	0.9773	1.7393	0.9539	33
7	1.0457	0.9792	1.5921	0.9595	46
8	1.0469	0.9792	1.5108	0.9614	55
9	1.0335	0.9798	2.4621	0.9447	74
10	1.0191	0.9805	10.3742	0.3583	91

Table S3: Effect of number of hidden layers on the training performance.

Number of hidden layer	Training set RMSE	Training set R^2	Extrapolation set RMSE	Extrapolation set R^2	Training time (s)
1	2.8214	0.8478	4.6256	0.7737	22
2	1.4013	0.9631	3.0079	0.9093	38
3	1.0469	0.9793	1.5514	0.9604	46
4	1.0469	0.9792	1.5108	0.9614	55
5	0.8877	0.9850	1.9617	0.9516	65
6	0.8913	0.9849	10.6475	0.2499	82
7	0.7707	0.9805	5.2443	0.7363	145