Instructions for running the program

Note:

The MATLAB code used in this study for implementing the PSO-ANFIS and GP models is available and can be provided upon request. Due to file size limitations and the platform's restriction on uploading .zip files, the supplementary materials could not include the full code package (Supplementary_Material_Code_PSO-ANFIS_GP.zip). Interested reviewers or readers may request the code by contacting the corresponding author via email.

This instruction is prepared based on Matlab® version 2022.

- 1- Download "MATLAB code" folder (available upon request via email).
- 2- Open Matlab Software and then open the Samplecalculator.m.
- 3- Open the "Sampledata.xls" file. Fill the required cells. You are able to fill more than one data sample.
- 4- Run the "Samplecalculator.m. The results of PSO-ANFIS model are accessible in the PredicteddataTable matrix at the MATLAB workspace.

In the following, an example of the calculations is provided.

Question: Calculate the absorption in the plasmonic metamaterial nanocavity arrays by PSO-ANFIS model with the following data in the Excel:

R	r	t	р	h	wl
80	60	10	240	175	247.6106
35	30	2.5	120	175	249.0288

Answer: after following the above instruction, the outcomes are reported in PredicteddataTable as follows:

```
Command Window

> In <u>fuzzy.internal.utility.evallis</u> (<u>line 30</u>)

In <u>evalfis</u> (<u>line 98</u>)

In <u>SampleCalculator</u> (<u>line 10</u>)

PSOANFISOutput =

0.9688

0.9789

Predicteddata =

0.9688

0.9789

PredicteddataTable =

2×1 <u>table</u>

<u>0.96881</u>

0.97893
```

Deta	ils							^			
۲ 😭	Yariables - PredicteddataTable										
+10	10 PredicteddataTable 🗶 AllInputs 🗶 AllTargets 🗶 LSSVMAllOutputs 🗶										
	2x3 <u>table</u>										
	1		2	3	4	5	6				
	LSSVMOutput	PSOANFISOutput		ANFISOutput							
1	3.3480		3.22/8	3.3884	4			-			
2	0.3644		0.3352	0.4003	1						
3											
4											
5								-			
	•				1	1	•				
Wor	rkspace							•			
N			14-1		1.0						
Name 🔺			Value		IVIIN	Max					
H MSEevalues			[0.0151,	[0.0151,0.1437,0.0472]		0.1437		^			
MaxX		[1.00036	[1.0003e+03,423]		1.0003						
H.	MaxY			4.1285		4.1285					
E.	HinX MinX			2/3]	1.3/00	2/3					
E:	MinY				1	0.0775					
			172v1 d	ouble	0.0252	1 2010		=			
			17221 0	0 33521	0.0332	3 2278					
PSOANFISTestOutputs			43x1 do	uble	0.4218	4.1672					
Πp	PSOANFISTrainOutputs			ouble	0.0352	4.2910					
ΠP	Predicteddata			3.2278,3.3884;	0.3352	3.3884					
PredicteddataTable			2x3 tab	le .							
R	2		1x172 d	ouble	1	172					
E R	2values		[0.9881,	0.8419,0.9606]	0.8419	0.9881					
Η Rall			[1,0.980	[1,0.9801;0.9801,1]		1					
Rtest			[1,0.917	[1,0.9175;0.9175,1]		1					
Rtrain			[1 0 994	0-0 9940 11	0 9940	1		T			