



Ejemplo MEPX

En este ejemplo, tenemos un problema de regresión en el que se busca predecir el consumo de energía eléctrica en un edificio.

0110
1001
1010

Data

Parameters

Results

Training data

Validation data

Test data

Advanced commands

Problem description

- regression problem
- prediction of the electrical energy consumption in a building.
- taken from PROBEN 1.
- I have removed the last 2 columns from the initial data (containing the results for hot and cold water consumption).

References:

Lutz Prechelt, Proben1: A Set of Neural Network Benchmark Problems and Benchmarking Rules, 1994

Tenemos los datos de entrenamiento. Según [la fuente](#) de donde se obtiene el problema, se busca una “predicción del consumo energético de un edificio. Tratar de predecir el consumo horario de energía eléctrica, agua caliente y agua fría, en función de la fecha, la hora del día, la temperatura exterior, la humedad del aire exterior, la radiación solar y la velocidad del viento.” Sin embargo, como dice en la imagen anterior, las columnas de agua caliente y fría fueron removidas, por lo que el sistema tiene solo una salida (el consumo de energía) representada por Target0:

Multi Expression Programming X - D:\Downloads\mepx_win64\mepx-projects\symbolic regression\single output\building1-energy.xml

Start Stop New project Load project Save project Save project as About Updates

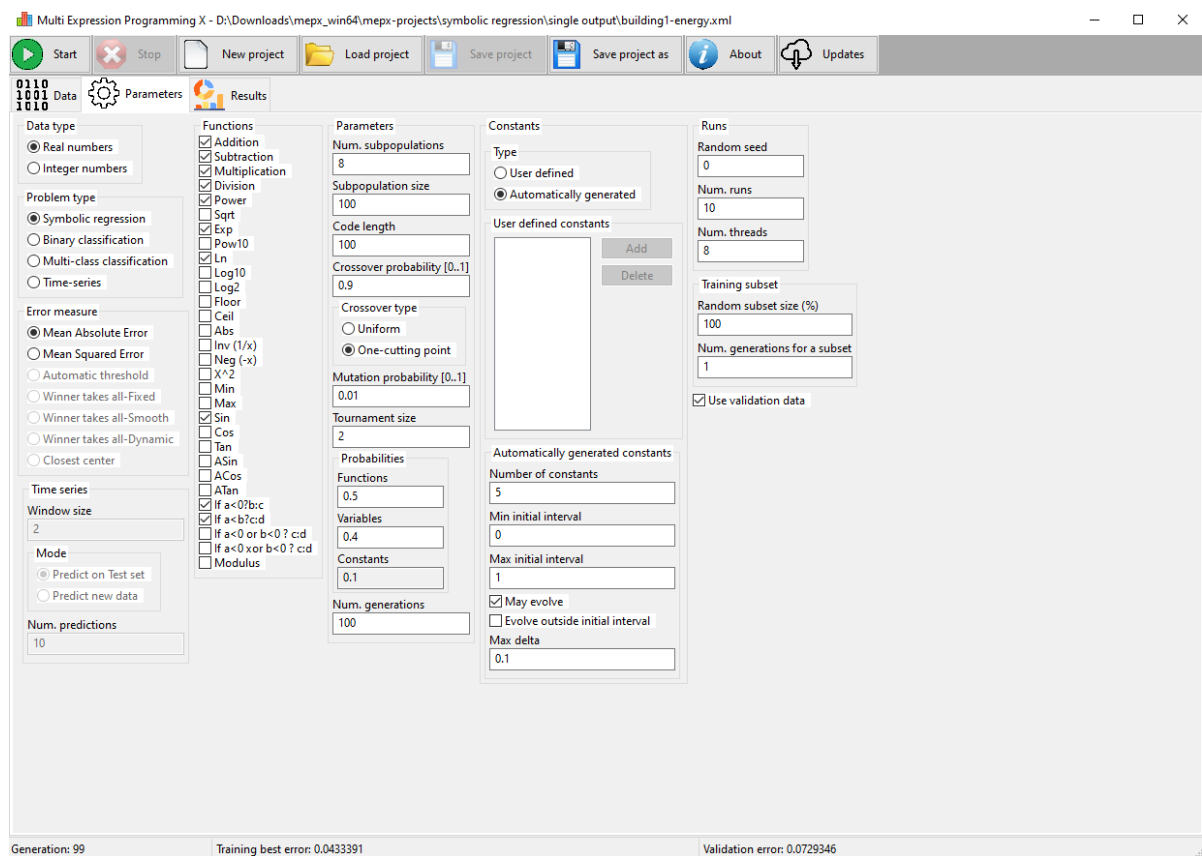
0110 Data Parameters Results

Training data Validation data Test data Advanced commands Problem description

	#	+x0	+x1	+x2	+x3	+x4	+x5	+x6	+x7	+x8	+x9	+x10	+x11	+x12	+x13	Target0
Load training data	263	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	1.000000	-1.000000	1.000000	0.774000	0.696000	0.009434	0.044643	0.405242
Delete training data	264	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.916667	-0.913043	1.000000	0.767000	0.712000	0.009528	0.071429	0.376532
Export training data	265	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.833333	-0.826087	1.000000	0.764000	0.732000	0.009528	0.098571	0.368003
Find values	266	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.750000	-0.739130	1.000000	0.760000	0.740000	0.009528	0.071786	0.359107
Replace values	267	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.666667	-0.652174	1.000000	0.757000	0.744000	0.009528	0.115000	0.351651
Shuffle	268	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.583333	-0.565217	1.000000	0.753000	0.756000	0.009528	0.123571	0.348383
Move to test	269	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.500000	-0.478261	1.000000	0.753000	0.752000	0.009528	0.138929	0.351145
Move to validation	270	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.416667	-0.391304	1.000000	0.746000	0.748000	0.009528	0.136786	0.381240
Paste from Clipboard	271	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.333333	-0.304348	1.000000	0.744000	0.740000	0.033491	0.149286	0.448588
Num. outputs	272	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.250000	-0.217391	1.000000	0.755000	0.768000	0.130000	0.198571	0.565089
	273	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.166667	0.166667	-0.130435	1.000000	0.772000	0.776000	0.239057	0.239643	0.606655
	274	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.083333	-0.043478	1.000000	0.804000	0.740000	0.550377	0.133214	0.616756
	275	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.043478	-1.000000	0.852000	0.652000	0.670943	0.178929	0.620799
	276	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.083333	0.130435	-1.000000	0.882000	0.552000	0.689906	0.159643	0.617947
	277	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.166667	0.217391	-1.000000	0.901000	0.480000	0.796226	0.191786	0.623506
	278	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.250000	0.304348	-1.000000	0.923000	0.444000	0.840377	0.193214	0.636563
	279	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.333333	0.391304	-1.000000	0.931000	0.440000	0.740943	0.188929	0.633475
	280	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.416667	0.478261	-1.000000	0.934000	0.424000	0.569245	0.254286	0.608040
	281	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.500000	0.565217	-1.000000	0.916000	0.480000	0.161698	0.336786	0.531492
	282	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.583333	0.652174	-1.000000	0.906000	0.472000	0.107830	0.226429	0.478198
	283	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.666667	0.739130	-1.000000	0.894000	0.516000	0.023868	0.245357	0.455241
	284	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.750000	0.826087	-1.000000	0.875000	0.548000	0.008774	0.210000	0.454230
	285	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.833333	0.913043	-1.000000	0.864000	0.568000	0.008868	0.220357	0.432104
	286	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.916667	1.000000	-1.000000	0.846000	0.620000	0.008962	0.235000	0.415253
	287	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	1.000000	-1.000000	1.000000	0.825000	0.668000	0.009151	0.178929	0.404280
	288	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.916667	-0.913043	1.000000	0.814000	0.688000	0.009245	0.114643	0.386259
	289	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.833333	-0.826087	1.000000	0.802000	0.708000	0.009340	0.087500	0.384743
	290	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.750000	-0.739130	1.000000	0.788000	0.736000	0.009340	0.132857	0.379205
	291	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.666667	-0.652174	1.000000	0.779000	0.760000	0.009340	0.117500	0.374075
	292	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.583333	-0.565217	1.000000	0.770000	0.792000	0.009340	0.127143	0.371520
	293	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.500000	-0.478261	1.000000	0.767000	0.800000	0.009434	0.141071	0.370495
	294	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.416667	-0.391304	1.000000	0.767000	0.804000	0.009717	0.135714	0.402840
	295	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.333333	-0.304348	1.000000	0.772000	0.812000	0.035849	0.163571	0.456044
	296	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.250000	-0.217391	1.000000	0.783000	0.800000	0.165849	0.105357	0.564743
	297	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.166667	-0.130435	1.000000	0.818000	0.764000	0.332075	0.160714	0.615434
	298	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.083333	-0.043478	1.000000	0.842000	0.724000	0.460566	0.200357	0.634126

Generation: 99 Training best error: 0.0433391 Validation error: 0.0729346

Las funciones de las que disponen los individuos y otros parámetros del programa.



Y los resultados del programa, en donde se logra un error relativamente bajo aproximado de 0.0464 luego de 100 generaciones:

