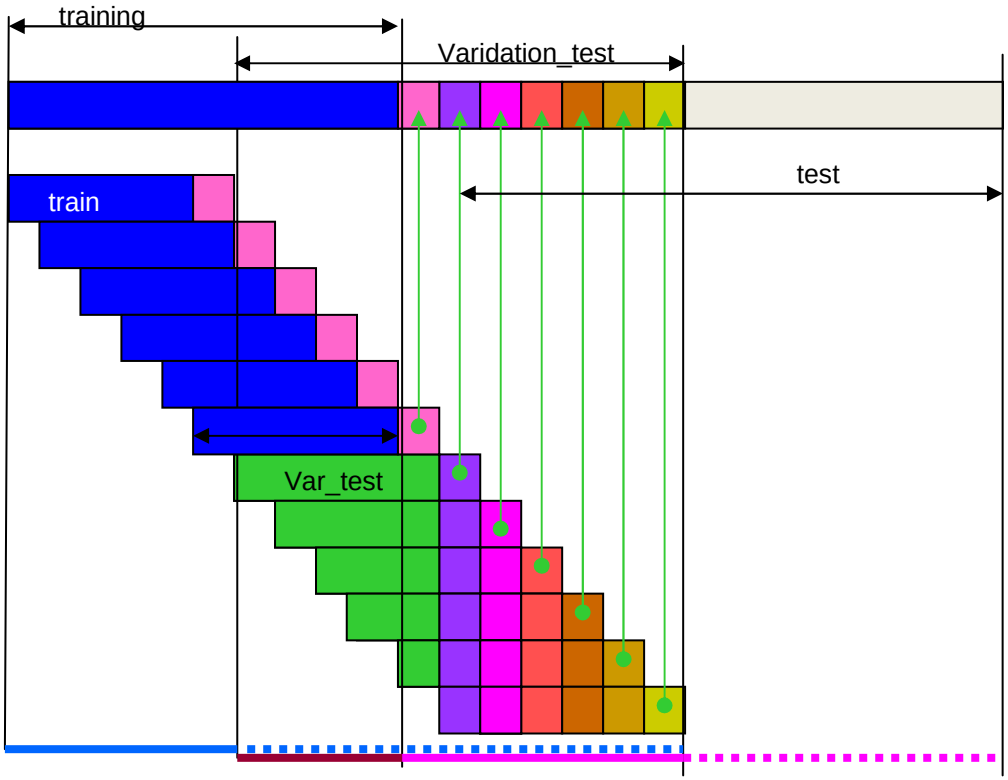
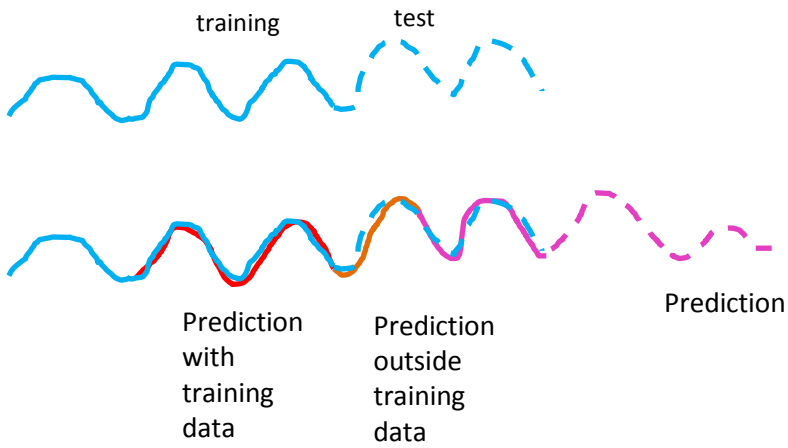
TimeSeriesRegression

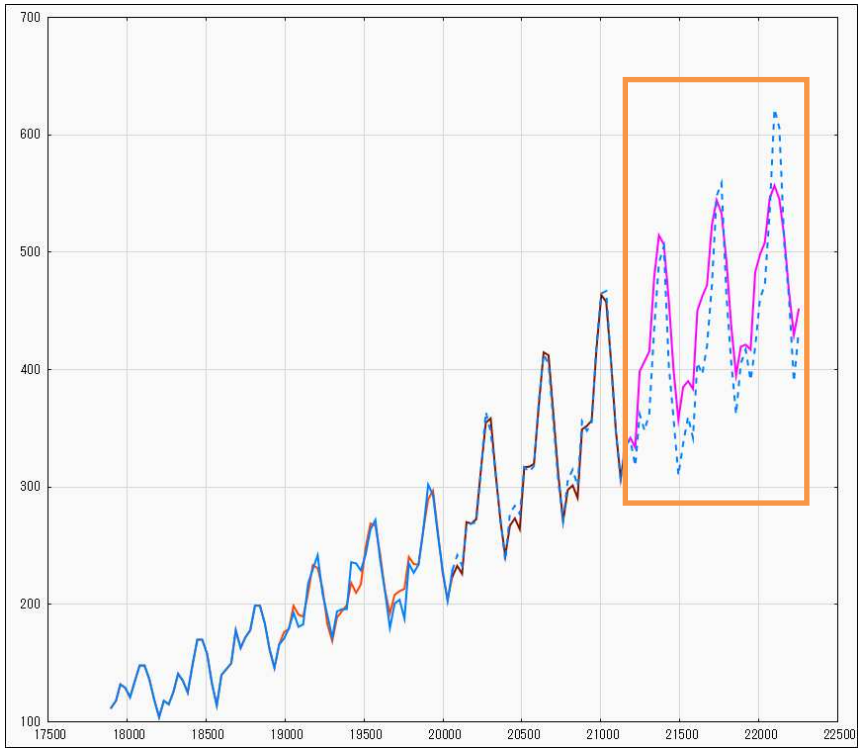
examples





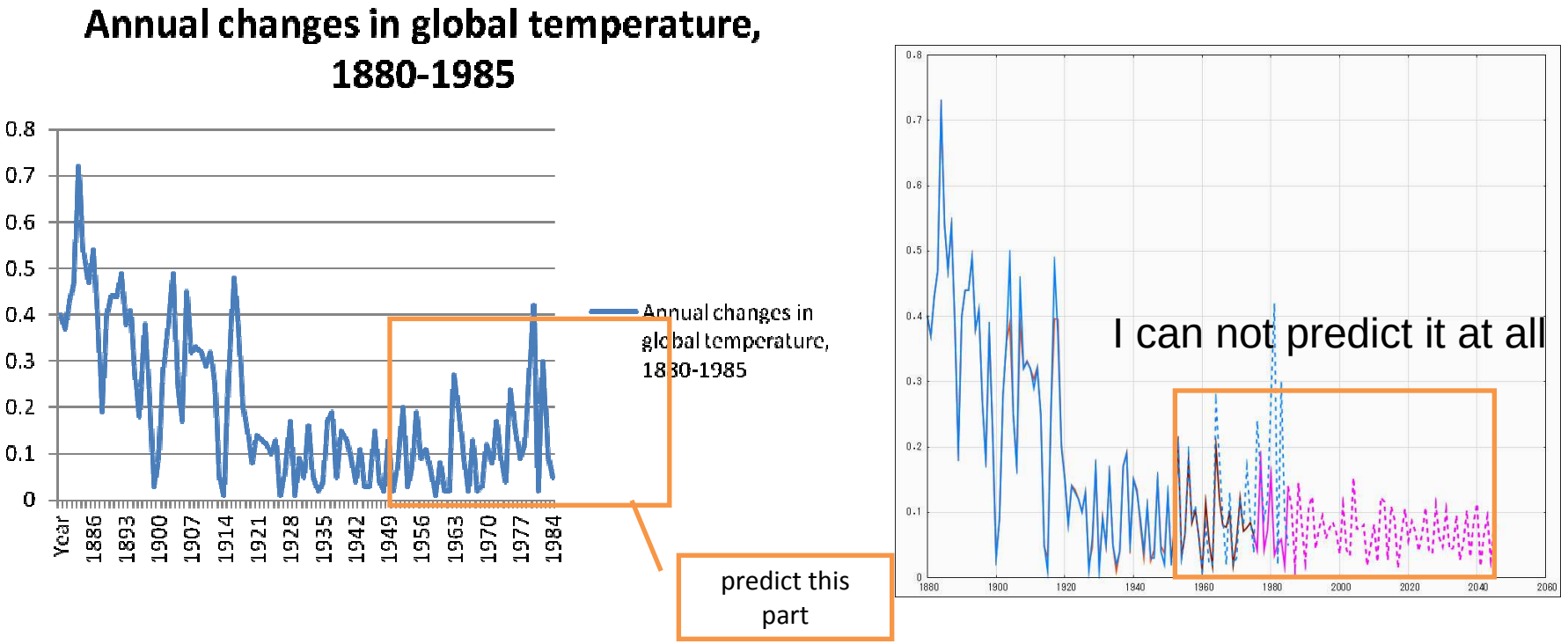
Plotting colors

international-airline-passengers



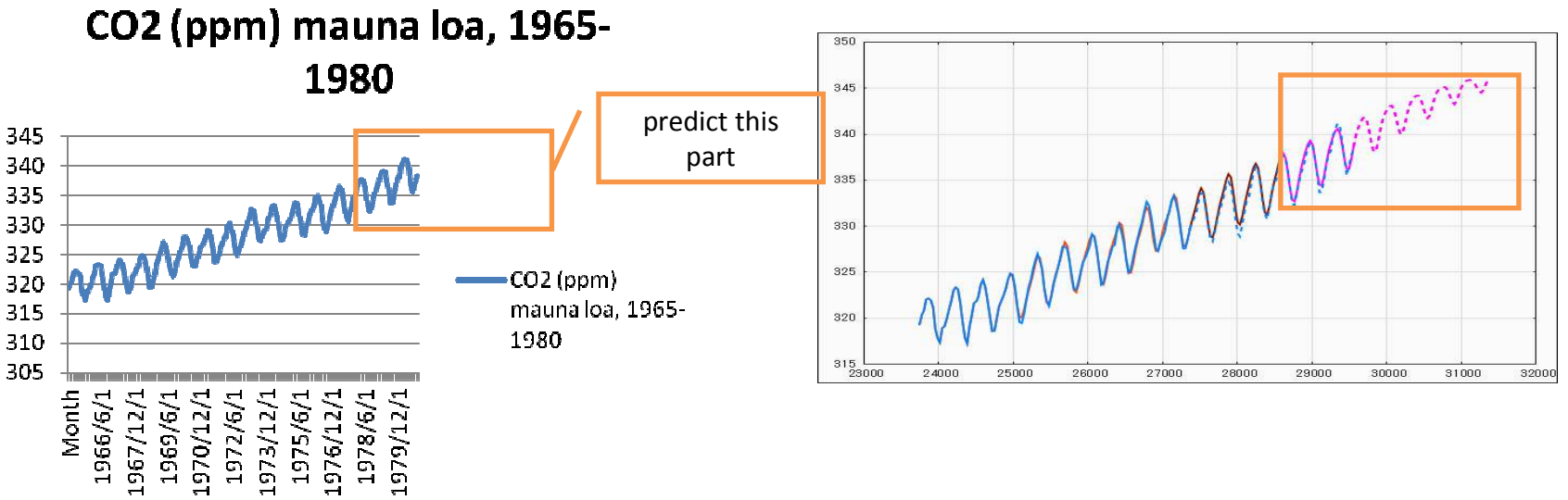
https://datamarket.com/data/set/22u3/international-airline-passengers-monthly-totals-in-thousands-jan-49-dec-60#!ds=22u3&display=line

annual-changes-in-global-tempera



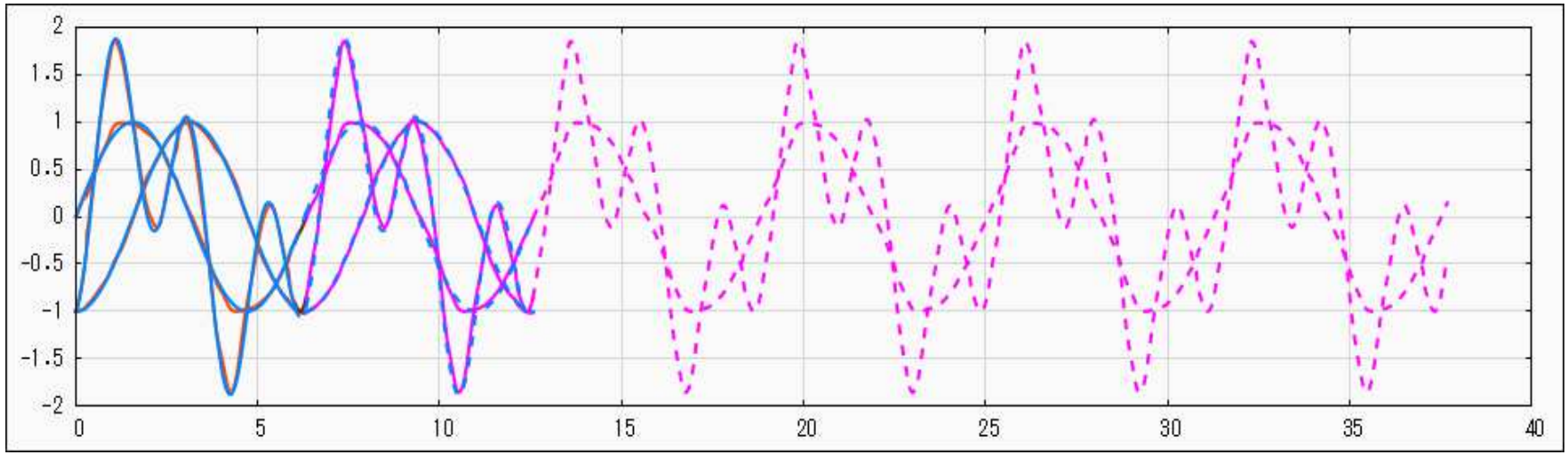
https://datamarket.com/data/set/22ku/annual-changes-in-global-temperature-1880-1985#!ds=22ku&display=line

co2-ppm-mauna-loa-1965-1980

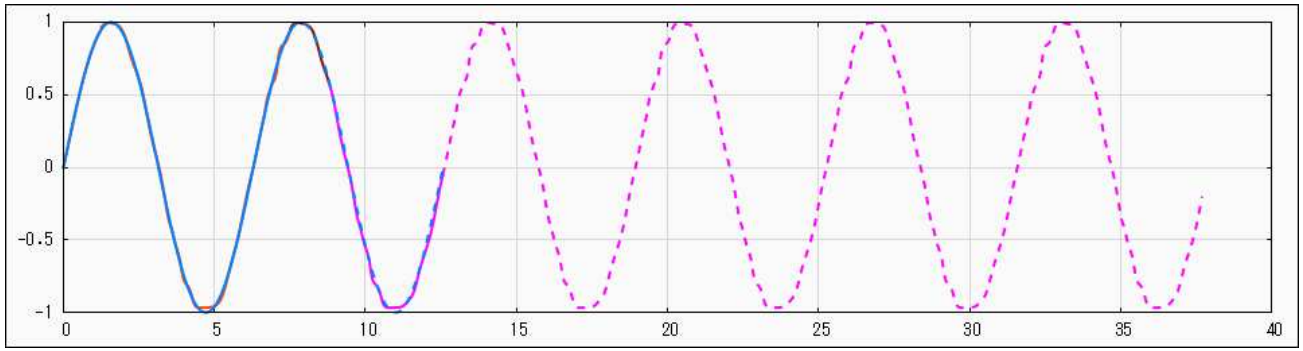


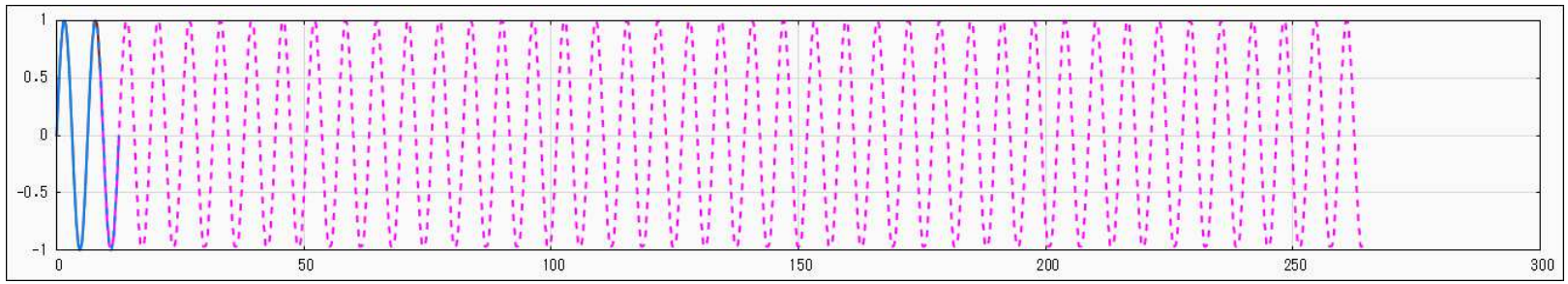
https://datamarket.com/data/set/22v1/co2-ppm-mauna-loa-1965-1980#!ds=22v1&display=line

$$\sin(x_0), \cos(x_1), \sin(x_0) + \cos(3x_1)$$



$\sin(x)$

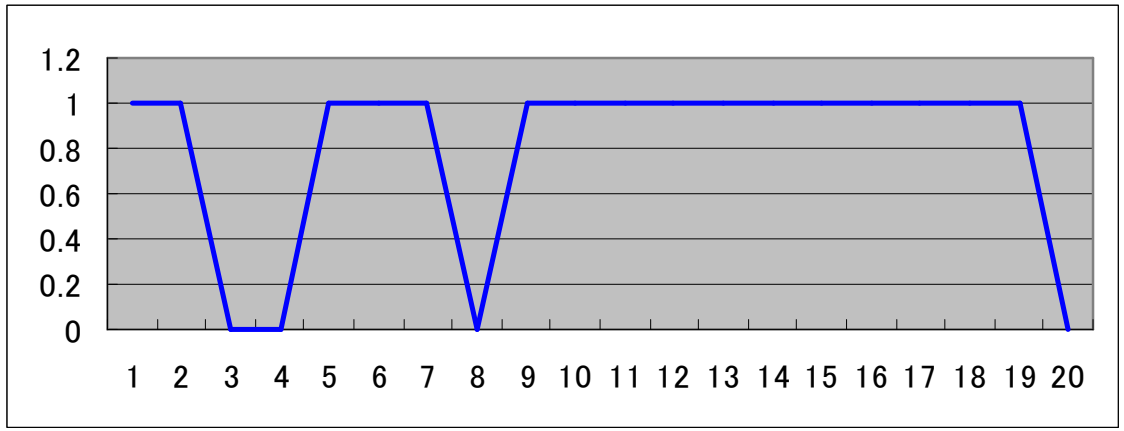




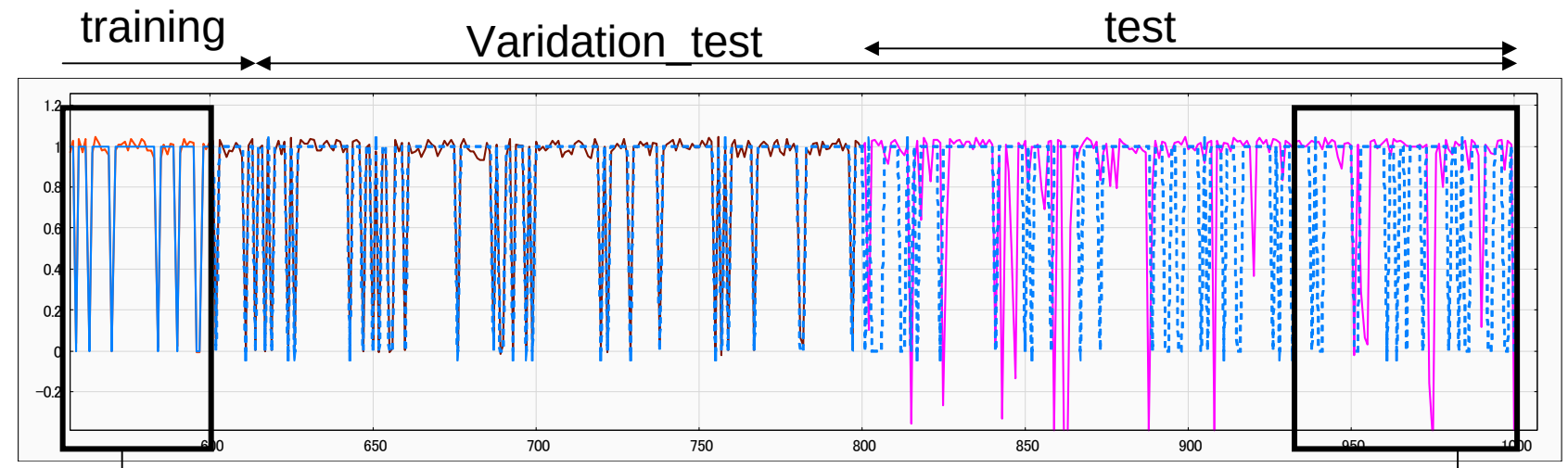
Random pattern

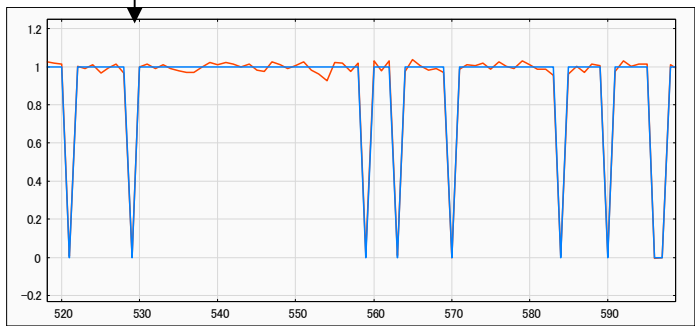
X	Y
0	1
0	1
1	0
1	0
0	1
0	1
0	1
1	0
0	1
0	1
0	1
0	1
0	1
0	1
0	1
0	1
0	1
0	1
0	1
1	0

$$y_t = \begin{cases} 1 & x_t = 0 \\ 0 & x_t = 1 \end{cases}$$

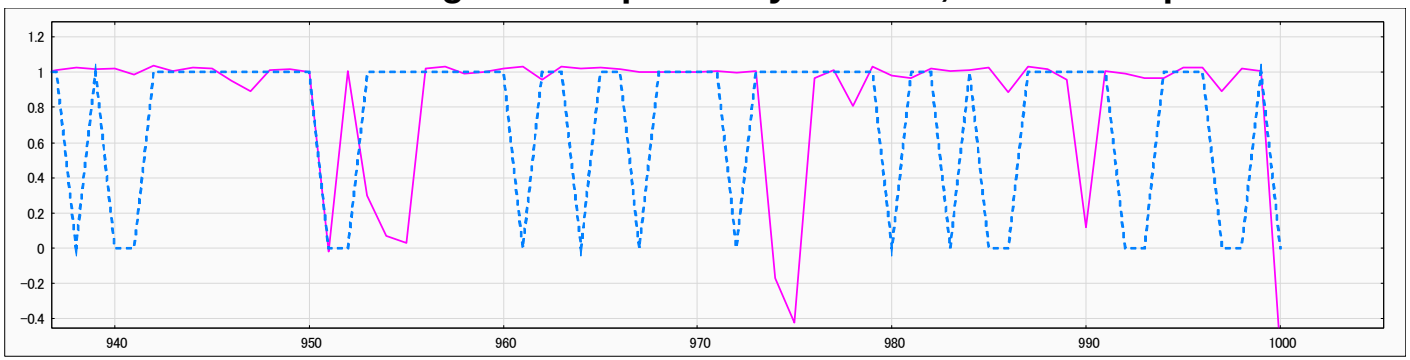


X is a non-uniform random value with a value of 0 or 1
The value of y changes to 1 or 0 with X as an explanatory variable.





Even if we give an explanatory variable, we can not predict it.



$$y_t = \begin{cases} 1 & x_t = 0 \\ 0 & x_t = 1 \end{cases}$$

Even if we give an explanatory variable, we can not predict it.

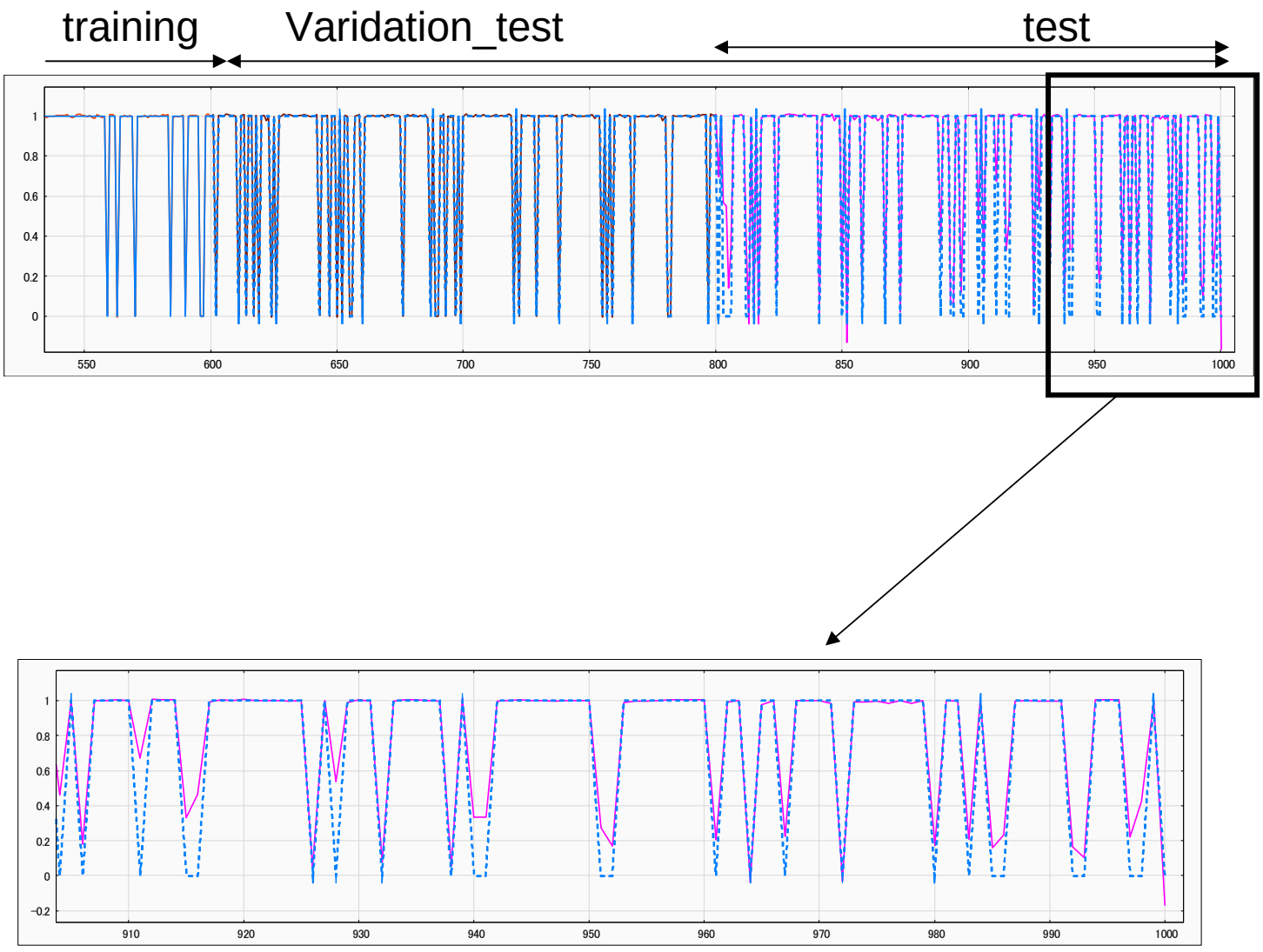
The reason is that the value of the next time is also required for the explanatory variable in order to predict the future (the next time) based on the result learned by RNN.

$$y_{t+1} = \begin{cases} 1 & x_{t+1} = 0 \\ 0 & x_{t+1} = 1 \end{cases} \qquad (y_t, x_t) \mapsto y_{t+1}$$

However, since x is randomly determined in problem setting, past information is not useful at all.
Even if X is random, if you know the future of X you can learn as follows.

$$(y_t, x_{t+1}) \mapsto y_{t+1}$$

X	Yx	Y
0	0	1
0	1	1
1	1	0
1	0	0
0	0	1
0	0	1
0	1	1
1	0	0
0	0	1
0	0	1
0	0	1
0	0	1
0	0	1
0	0	1
0	0	1
0	0	1
0	0	1
0	0	1
0	1	1
1	0	0



You can predict it by giving an explanatory variable.