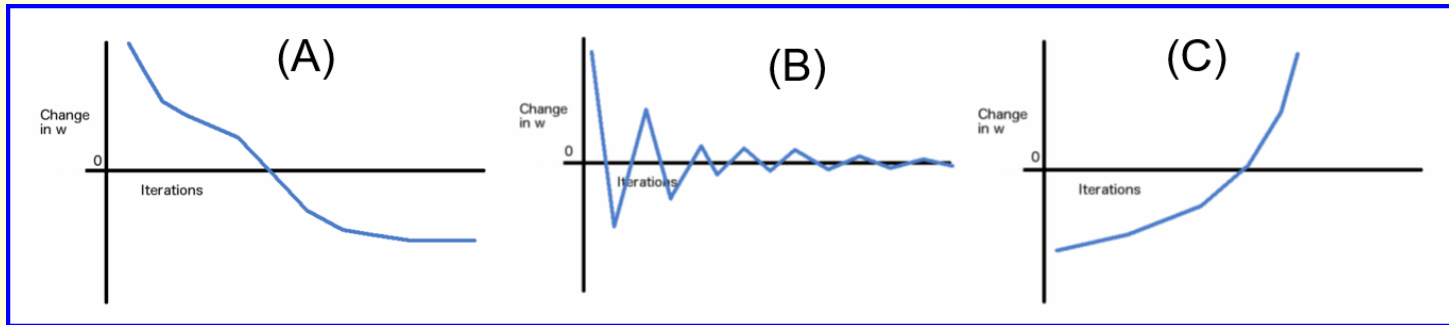


Homework assignments for Class #3



1. Suppose w is the weight on some connection in a neural network. The network is trained using gradient descent until the learning converges. We plot the change of w as training progresses. Which of the following scenarios shows that convergence has occurred? Notice that plotted is the change in w , as opposed to w itself.



2. The simple example illustrating hyperparameter optimization with RandomSearch tuner makes use of synthetic data with 3 independently expressed genes and 3 cross-products. Modify the script `ae_ktuner_random.py` by increasing the number of independently expressed genes to 4 and the number of cross-products to 10. Change the ranges of variation of tunable hyperparameters as needed and perform hyperparameter optimization using the modified script.

3. The first Dense layer of the Tybalt's VAE model takes as input a tensor of 5,000 gene expression levels and transforms it into a tensor of 100 hidden variables. How many artificial neurons constitute this layer? How many parameters are used by these neurons?