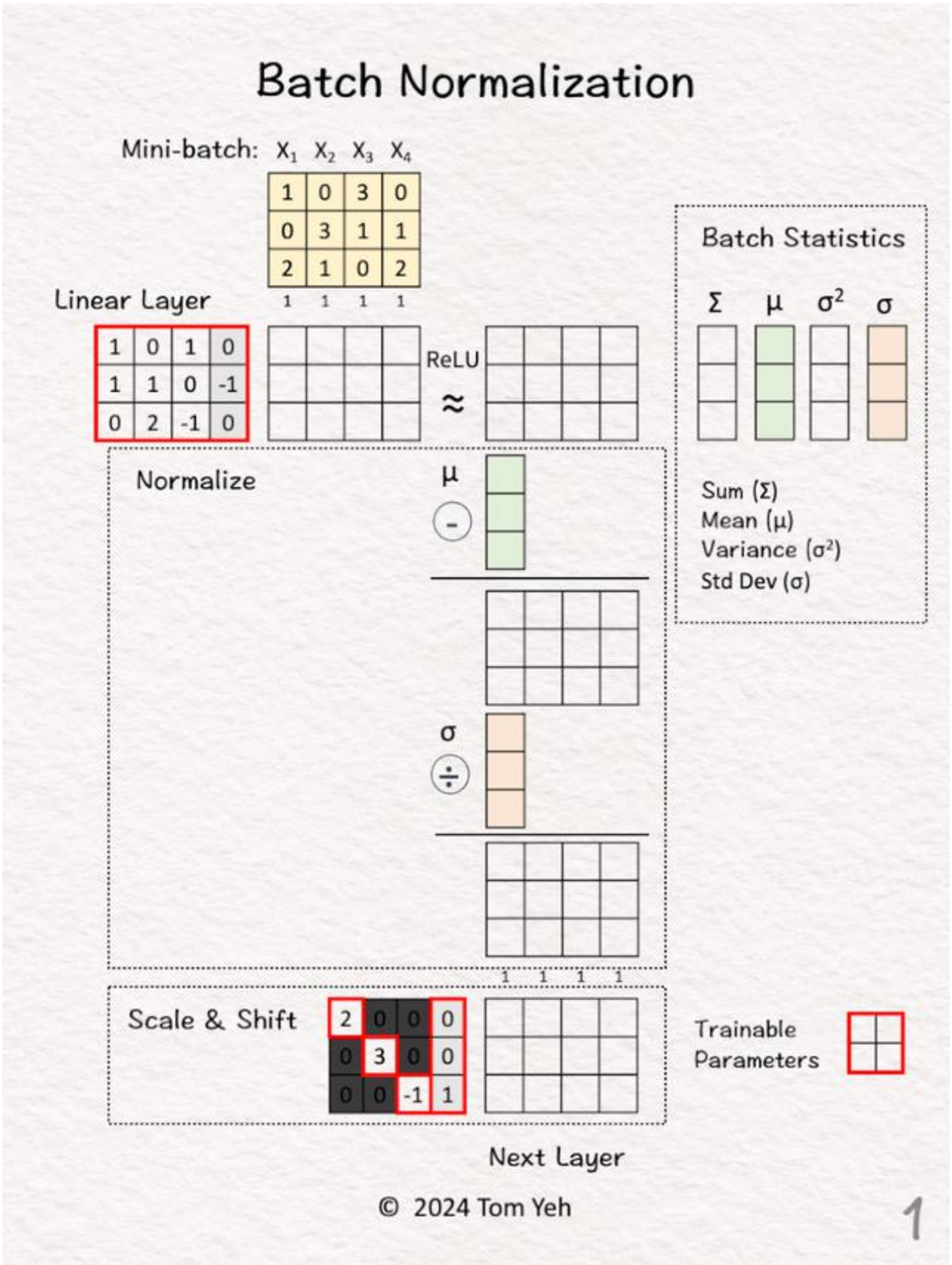
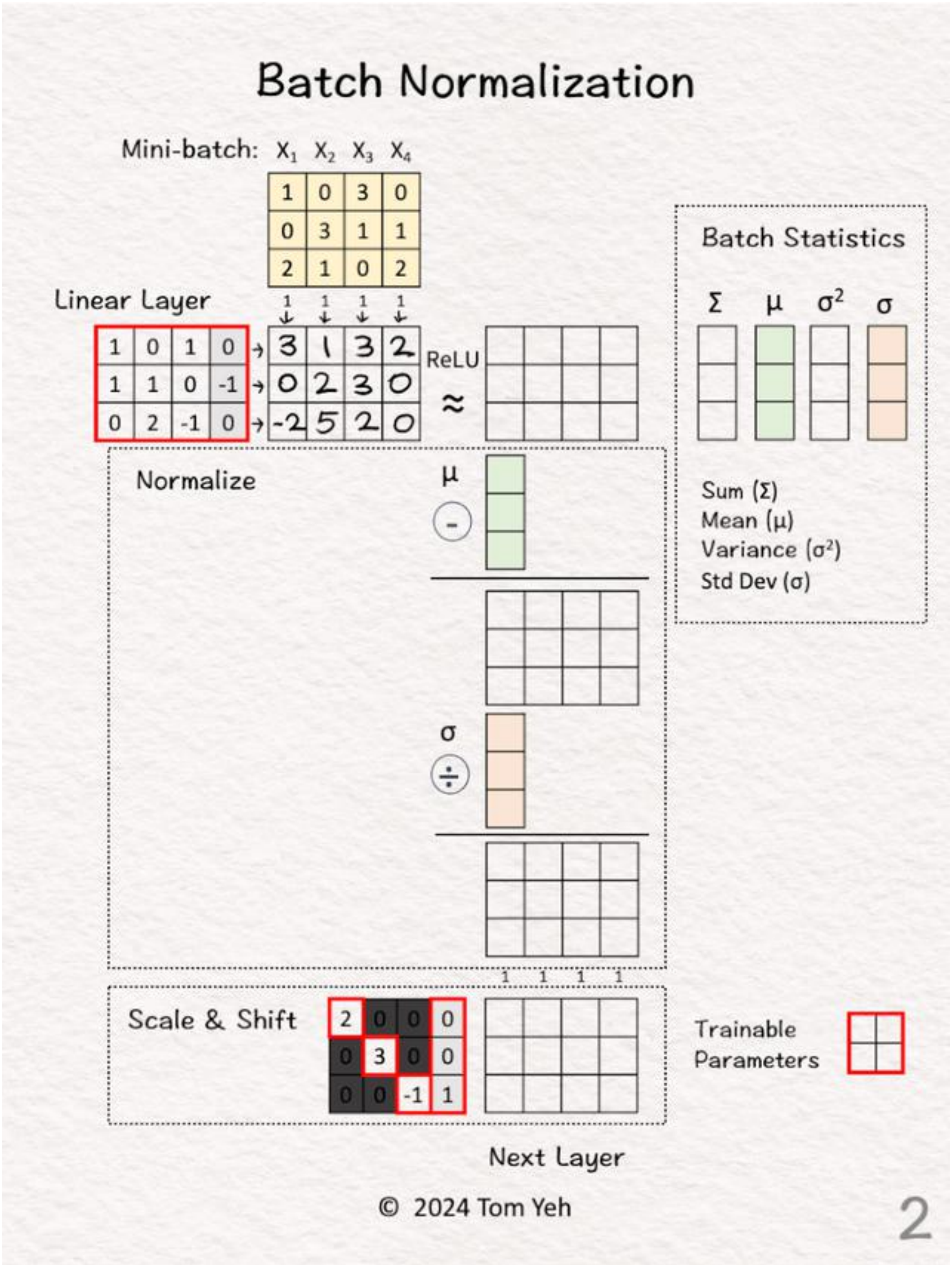


[1] 给定

一个包含4个训练样本的小批量，每个样本有3个特征。

[1] Given

A mini-batch of 4 training examples, each has 3 features.

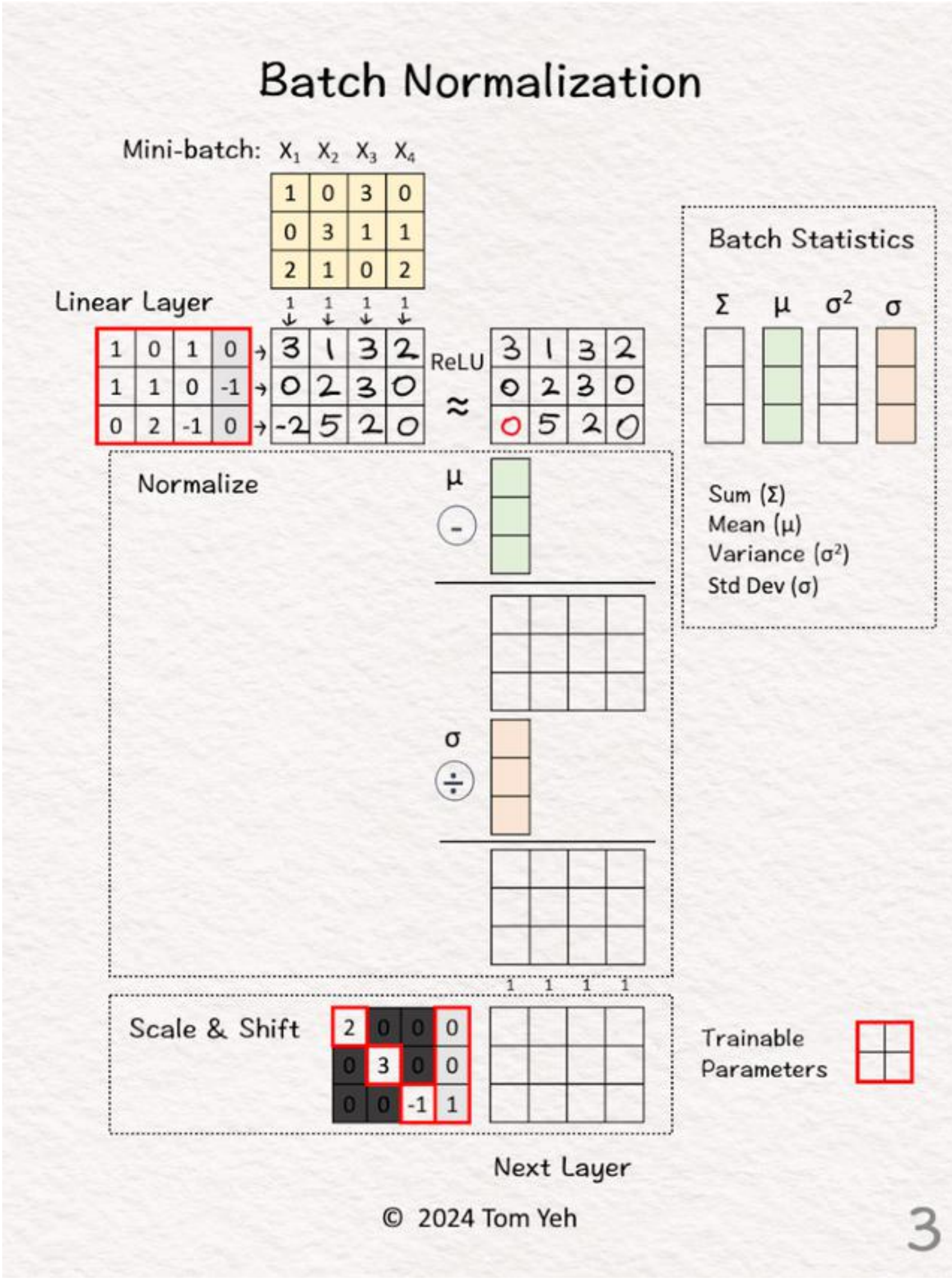


[2] 线性层

通过权重和偏置进行乘法操作以获得新的特征。

[2] Linear Layer

Multiply with the weights and biases to obtain new features

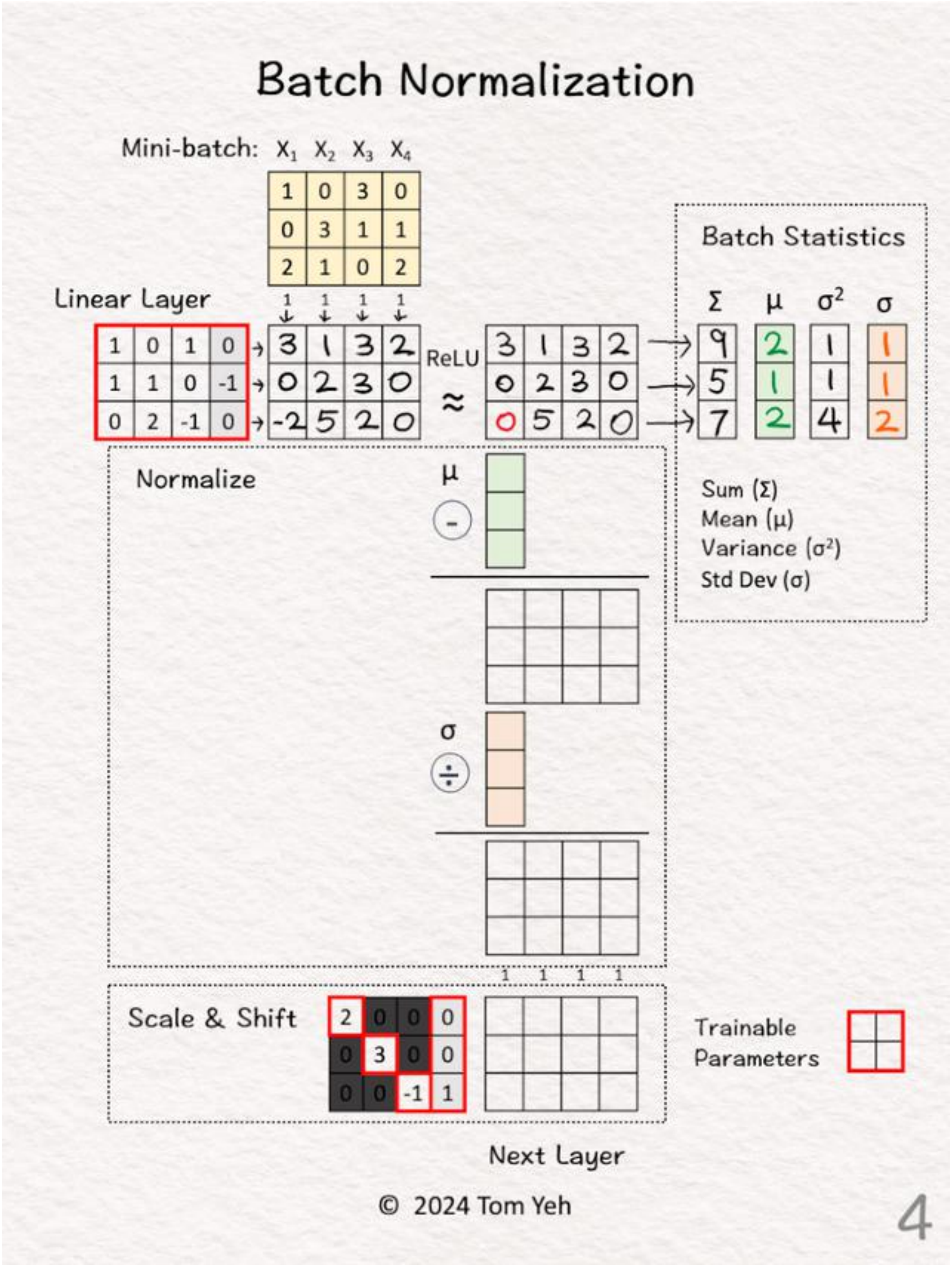


[3] ReLU

应用ReLU激活函数，该函数的效果是抑制负值。在此练习中，-2被设为0。

[3] ReLU

Apply the ReLU activation function, which has the effect of suppressing negative values. In this exercise, -2 is set to 0.



[4] 批量统计

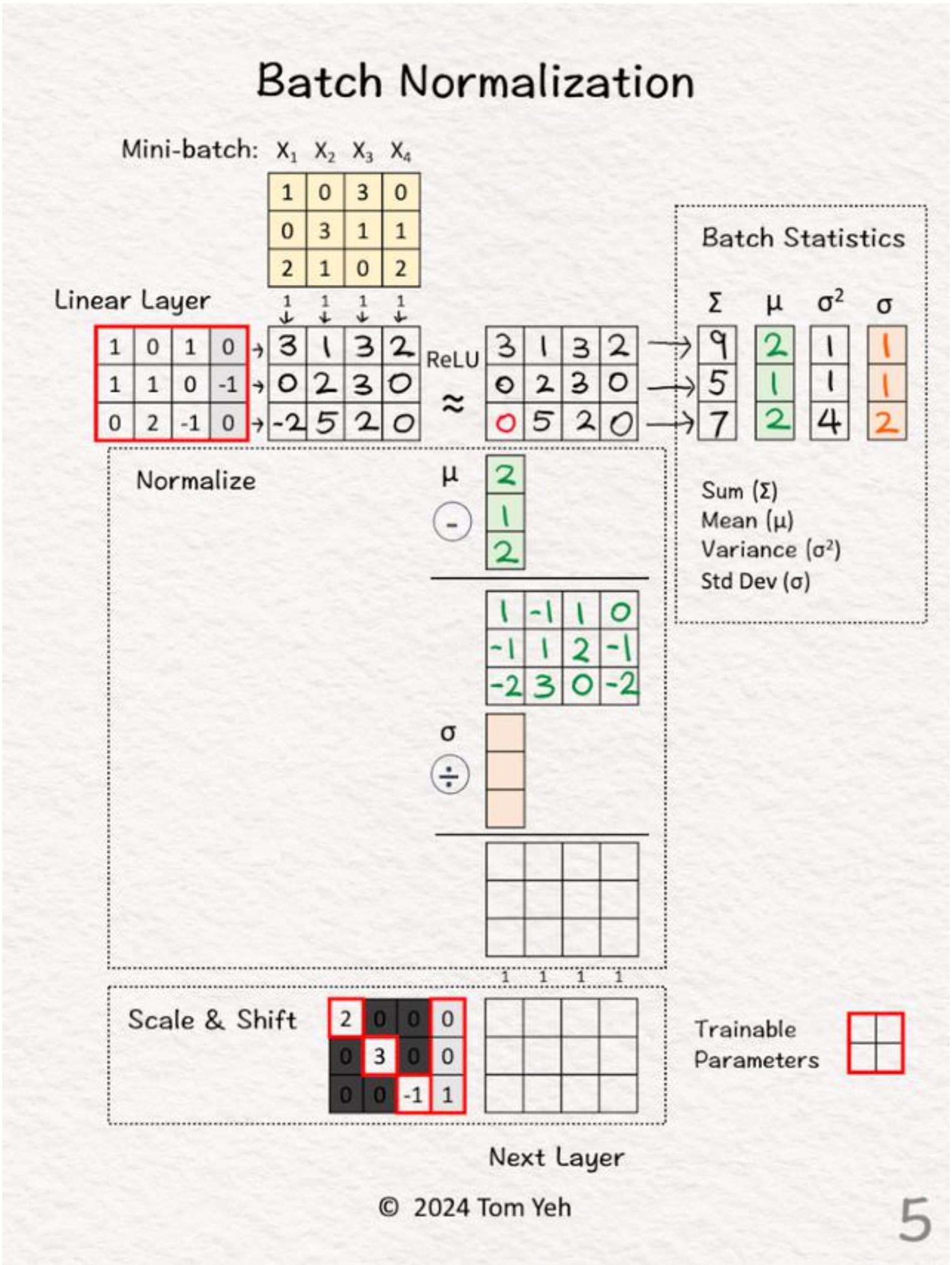
计算这个小批量中四个样本的总和、均值、方差和标准差。

注意，这些统计量是针对每一行（即每个特征维度）计算的。

[4] Batch Statistics

Compute the sum, mean, variance, and standard deviation across the four examples in this min-batch.

Note that these statistics are computed for each row (i.e., each feature dimension).



[5] 均值归零

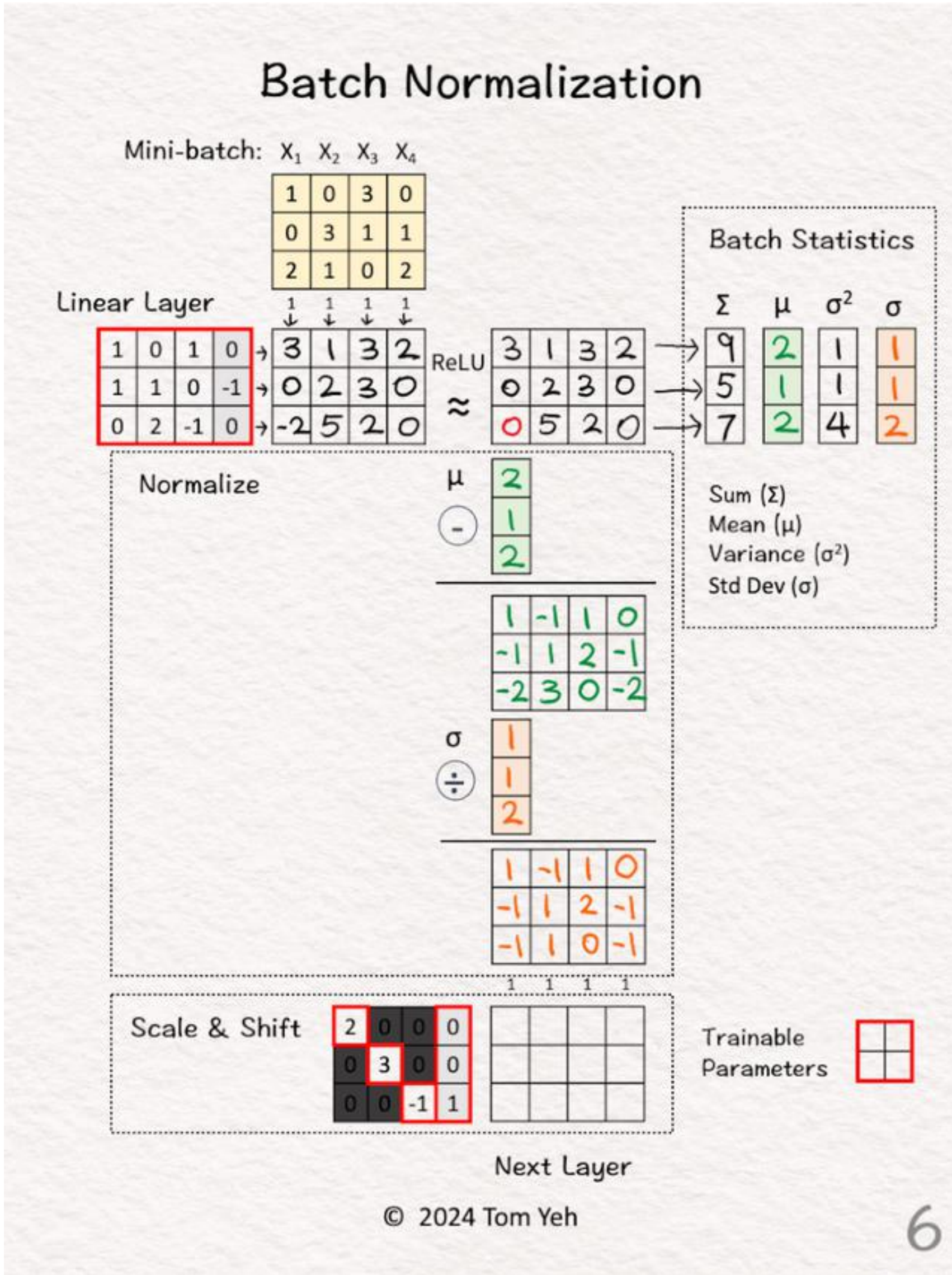
从每个训练样本的激活值中减去均值（绿色）

目的是使每个维度中的4个激活值的平均值为零

[5] Shift to Mean = 0

Subtract the mean (green) from the activation values for each training example

The intended effect is for the 4 activation values in each dimension to average to zero



[6] 方差归一

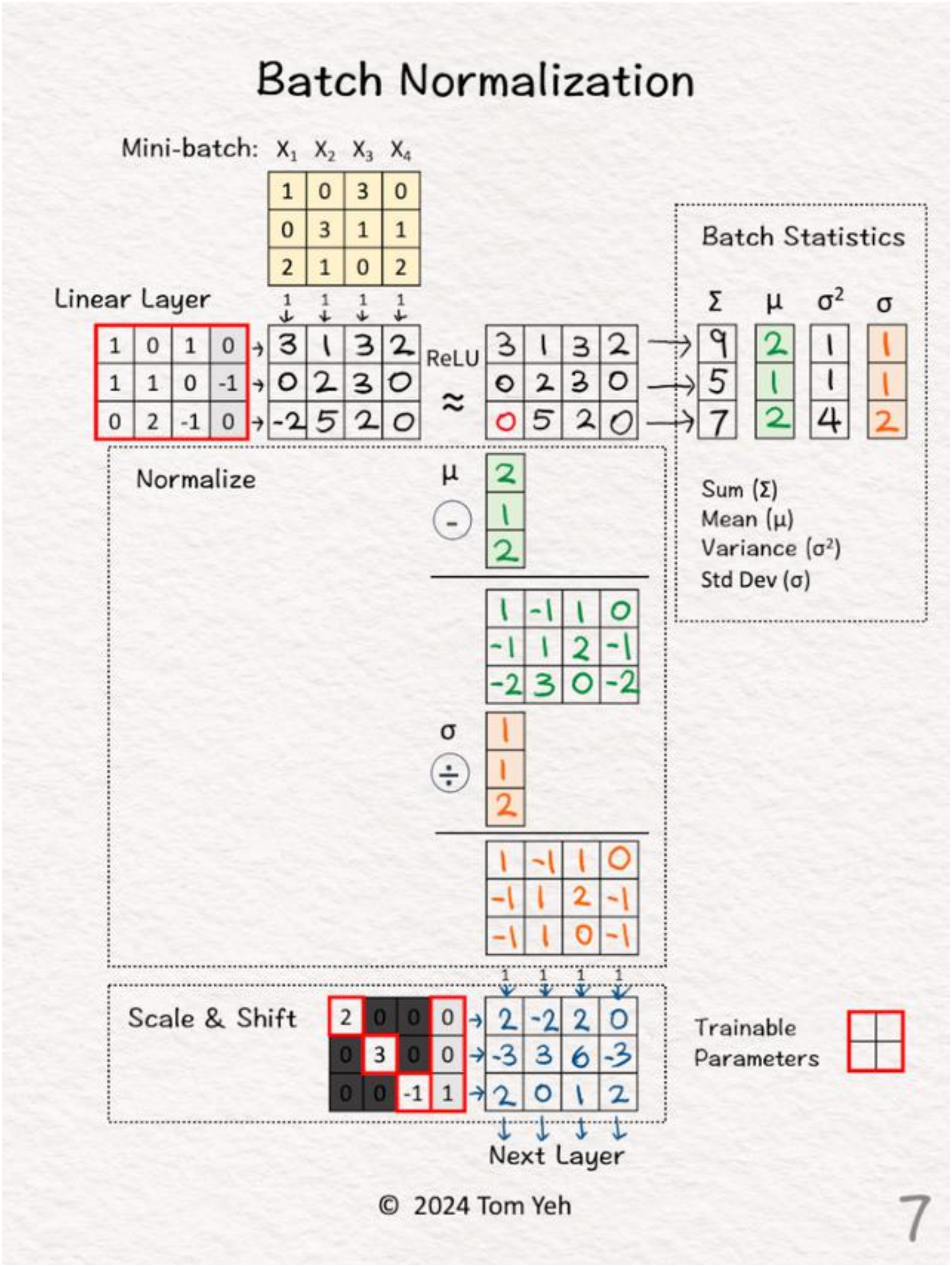
除以标准差（橙色）

目的是使4个激活值的方差等于一。

[6] Scale to Variance = 1

Divide by the standard deviation (orange)

The intended effect is for the 4 activation values to have variance equal to one.



[7] 缩放与偏移

将来自[6]的标准化特征乘以线性变换矩阵，并将结果传递给下一层

目的是将标准化的特征值缩放和偏移至新的均值和方差，这些新的

均值和方差是网络将要学习的

对角线上的元素和最后一列是网络将要学习的可训练参数。

[7] Scale & Shift

Multiply the normalized features from [6] by a linear transformation matrix, and pass the results to the next layer

The intended effect is to scale and shift the normalized feature values to a new mean and variance, which are to be learned by the network

The elements in the diagonal and the last column are trainable parameters the network will learn.