In [3]:

```
with torch.no_grad():
    BATCH_SIZE, NUMBER_OF_CHANNELS = 2, 3  # dim 0 -> batch; dim 1 -> channel; dim 2 -> character, as assumed by torch.nn.Conv1d()
    inp = torch.zeros(BATCH_SIZE, NUMBER_OF_CHANNELS, 10)
    inp2 = torch.zeros(BATCH_SIZE, NUMBER_OF_CHANNELS, 10)
    inp2[:,:,5] = torch.rand(BATCH_SIZE, NUMBER_OF_CHANNELS) # Change all NUMBER_OF_CHANNELS channels of the 5th character.
    BN = nn.BatchNorm1d(NUMBER_OF_CHANNELS)
    print('Output of torch.nn.BatchNorm():')
    print(BN(inp2)-BN(inp),end='\n\n') # Changing the single character 5 affects all the channels for characters 0-4.
    LN = nn.LayerNorm(NUMBER_OF_CHANNELS)
    print('Whereas we expect an output similar to:')
    print((LN(inp2.transpose(1,2))-LN(inp.transpose(1,2))).transpose(1,2))
```

```
Output of torch.nn.BatchNorm():
tensor([[[-0.2949, -0.2949, -0.2949, -0.2949, -0.2949,  4.1279, -0.2949, -0.2949, -0.2949, -0.2949],
         [-0.2621, -0.2621, -0.2621, -0.2621, -0.2621,  4.3115, -0.2621, -0.2621, -0.2621, -0.2621],
         [-0.2696, -0.2696, -0.2696, -0.2696, -0.2696,  0.5681, -0.2696, -0.2696, -0.2696, -0.2696]],

        [[-0.2949, -0.2949, -0.2949, -0.2949, -0.2949,  1.1796, -0.2949, -0.2949, -0.2949, -0.2949],
         [-0.2621, -0.2621, -0.2621, -0.2621, -0.2621,  0.4071, -0.2621, -0.2621, -0.2621, -0.2621],
         [-0.2696, -0.2696, -0.2696, -0.2696, -0.2696,  4.2852, -0.2696, -0.2696, -0.2696, -0.2696]]])

Whereas we expect an output similar to:
tensor([[[ 0.0000,  0.0000,  0.0000,  0.0000,  0.0000,  1.0214,  0.0000,  0.0000,  0.0000,  0.0000],
         [ 0.0000,  0.0000,  0.0000,  0.0000,  0.0000,  0.3363,  0.0000,  0.0000,  0.0000,  0.0000],
         [ 0.0000,  0.0000,  0.0000,  0.0000,  0.0000, -1.3577,  0.0000,  0.0000,  0.0000,  0.0000]],

        [[ 0.0000,  0.0000,  0.0000,  0.0000,  0.0000, -0.3617,  0.0000,  0.0000,  0.0000,  0.0000],
         [ 0.0000,  0.0000,  0.0000,  0.0000,  0.0000, -1.0031,  0.0000,  0.0000,  0.0000,  0.0000],
         [ 0.0000,  0.0000,  0.0000,  0.0000,  0.0000,  1.3648,  0.0000,  0.0000,  0.0000,  0.0000]]])
```