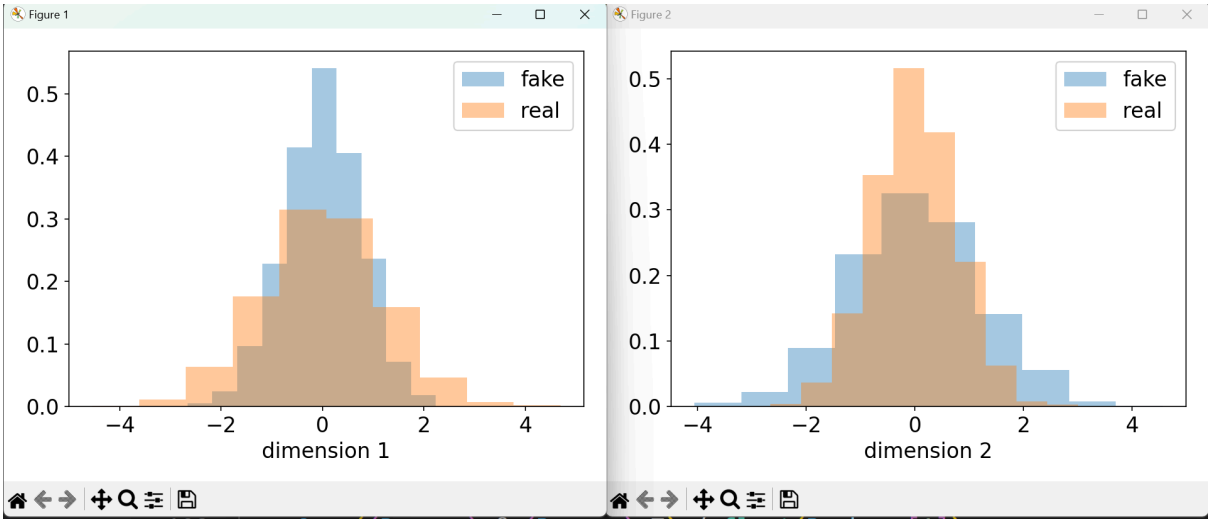
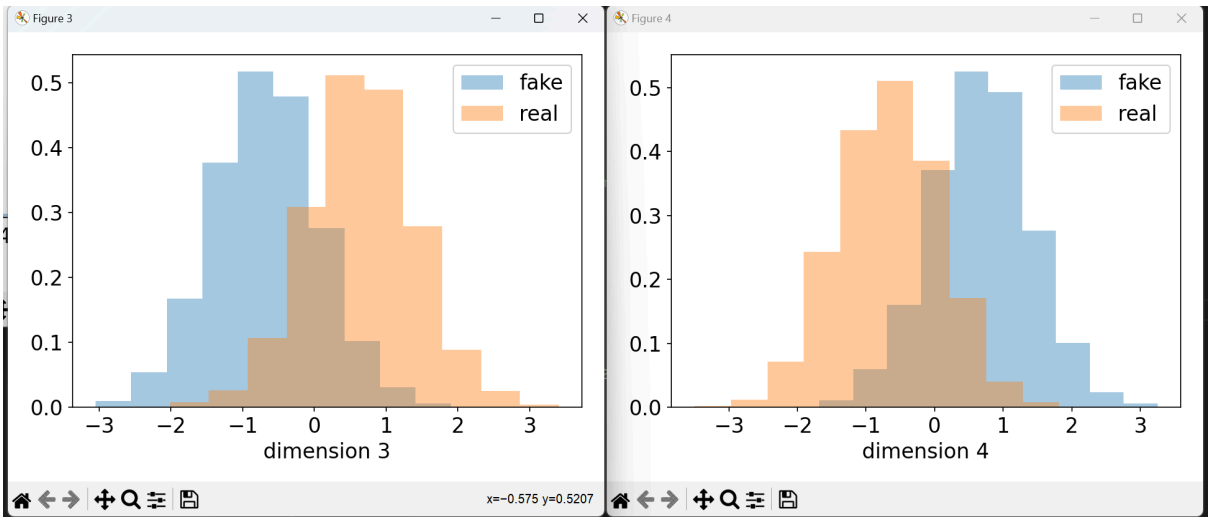
LAB02 REPORT




```
Class 0
Mean:
[[ 0.00287744]
 [ 0.01869316]
 [-0.68094016]
 [ 0.6708362 ]
 [ 0.02795697]
 [-0.0058274 ]]
Covariance:
[[ 5.69581054e-01  4.43400885e-03  8.43170041e-03  1.44479381e-02
   1.42672670e-02 -1.41150344e-03]
 [ 4.43400885e-03  1.42086571e+00 -4.75806611e-03 -1.22432969e-02
  -2.57280214e-03 -5.54092626e-03]
 [ 8.43170041e-03 -4.75806611e-03  5.49977025e-01  1.32035878e-02
  -1.15251868e-02  1.11043986e-02]
 [ 1.44479381e-02 -1.22432969e-02  1.32035878e-02  5.36042661e-01
   7.07380678e-03  1.59744284e-02]
 [ 1.42672670e-02 -2.57280214e-03 -1.15251868e-02  7.07380678e-03
   6.80073597e-01  1.20001652e-02]
 [-1.41150344e-03 -5.54092626e-03  1.11043986e-02  1.59744284e-02
   1.20001652e-02  7.05038438e-01]]
Variance: [0.56958105 1.42086571 0.54997702 0.53604266 0.6800736  0.70503844]
Std. dev.: [0.75470594 1.19200072 0.74160436 0.73214934 0.82466575 0.83966567]
```

```
Class 1
Mean:
[[ 5.44547838e-04]
 [-8.52437392e-03]
 [ 6.65237846e-01]
 [-6.64195349e-01]
 [-4.17251858e-02]
 [ 2.39384879e-02]]
Covariance:
[[ 1.43023345  0.00586459 -0.00328748  0.01305324  0.00569339 -0.02439541]
 [ 0.00586459  0.57827792 -0.0085804  -0.006824   -0.0063889   0.0042779 ]
 [-0.00328748 -0.0085804   0.5489026   0.01126717  0.00465291 -0.01835331]
 [ 0.01305324 -0.006824    0.01126717  0.55334275 -0.00288255  0.02041834]
 [ 0.00569339 -0.0063889   0.00465291 -0.00288255  1.31776792 -0.00914104]
 [-0.02439541  0.0042779  -0.01835331  0.02041834 -0.00914104  1.28702609]]
Variance: [1.43023345 0.57827792 0.5489026  0.55334275 1.31776792 1.28702609]
Std. dev.: [1.19592368 0.76044587 0.74087962 0.74387012 1.14794073 1.13447172]
```

The first two features show similar behavior with a peak at around the 0 value although in the first feature there are more fake while in the second more real. The classes overlap at 0 value. The mean is very small for both of the two features but they differ for some order of magnitude and the variance is the opposite for the two classes. For both features there is an evident peak at the 0 value.

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   1.20001652e-02  7.05038438e-01]]
Variance: [0.56958105 1.42086571 0.54997702 0.53604266 0.6800736  0.70503844]
Std. dev.: [0.75470594 1.19200072 0.74160436 0.73214934 0.82466575 0.83966567]
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Covariance:
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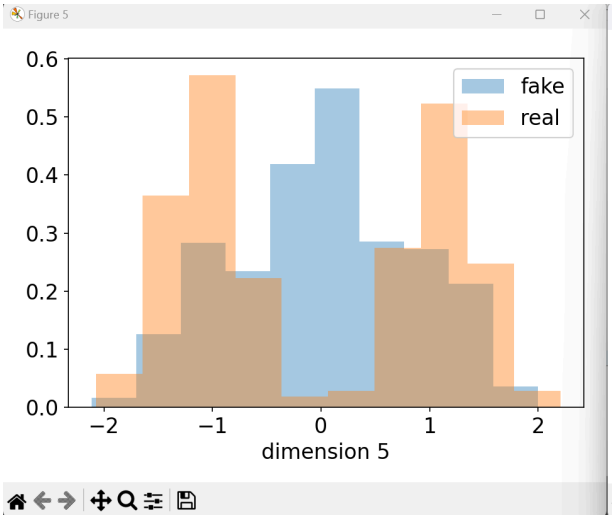
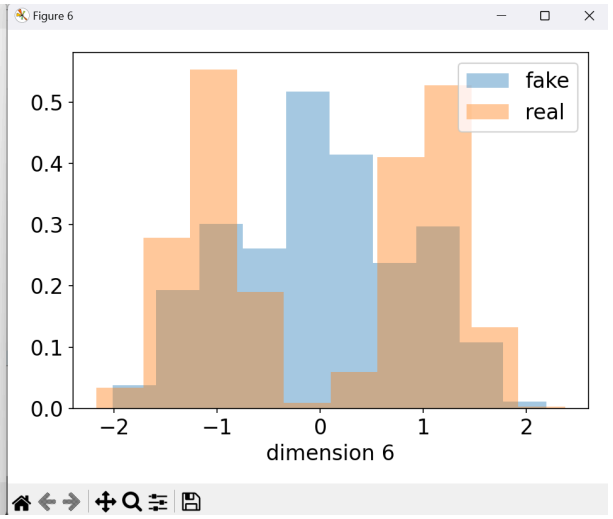
```

The 3rd and 4th features have the classes overlapping way less than the first two features, although there is still a bit of overlapping around the values equals zero. Feature 3 has a negative mean in class 0 while it is positive in class 1, while feature 4 does the opposite, with a positive mean for class 0 and a negative one for class 1. The variances are pretty similar. We can see peaks at around -1/1 for both features.



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```
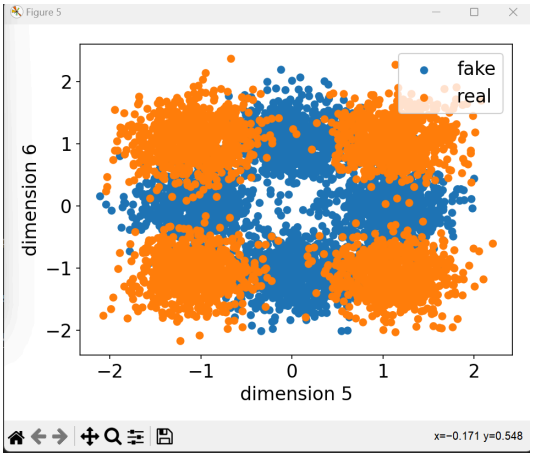

These last two features behave in a different way than the previous ones, for both of them, the fake class has a distribution that can be easily represented with a gaussian, while the true one does not. The classes overlap a little bit in the -1/1 area, and we can see evident peaks at around -1,0,1.



The scatter plot is very interesting because we can see the class distribution among the different values of the features. It's clearly visible in the graph the presence of 4 clusters for each class,depending on the values of the features. This can make classifying a little bit more difficult.