# Progress in Screening Methodology

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## 1 Example 1. A location problem with marginal features

I made the modification of changing the median of the signals to 5 in order to improve the performance of the screening algorithm.
In 100/100 cases, the set of detected signals is exactly equal to the actual set. The actual set of marginals is {1, 2, 3, 4}.
Here is the barplot which portrays how many times each feature was detected using our screening algorithm.

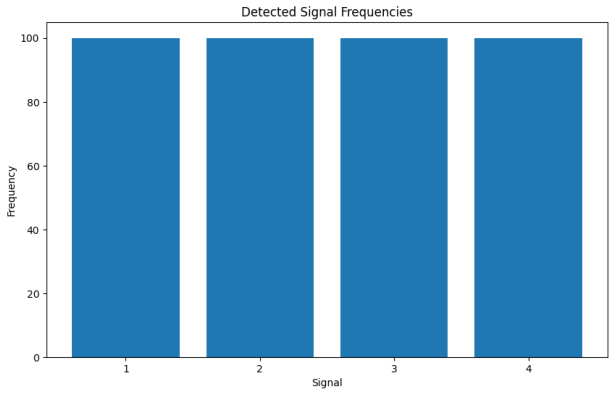


Figure 1: Frequency of different features in detected signals for Example 1

## 2 Example 2. A scale problem with paired features.

I made no modifications to the example.
In 100/100 cases, the correct set of signal pairs {1,2} and {3,4} is exactly detected in the pair column.
Here is the barplot which portrays how many times each pair of features was detected using our screening algorithm.

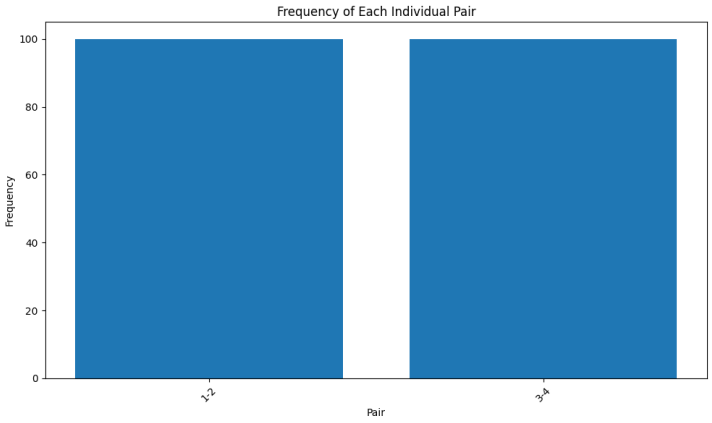


Figure 2: Frequency of detected signal pairs for Example 2.

# 3 Example 3. A location-scale problem with marginal and paired features

We are yet to build a screening algorithm to deal with such mixed cases.

# 4 Example 4. A scale problem with marginal features

I made the modification of changing the scaling factor to 10 in order to improve the performance of the screening algorithm.
In 85/100 cases, the set of detected signals is exactly equal to the actual set. The actual set of marginals is {1, 2, 3, 4}.
Here is the barplot which portrays how many times each feature was detected using our screening algorithm.

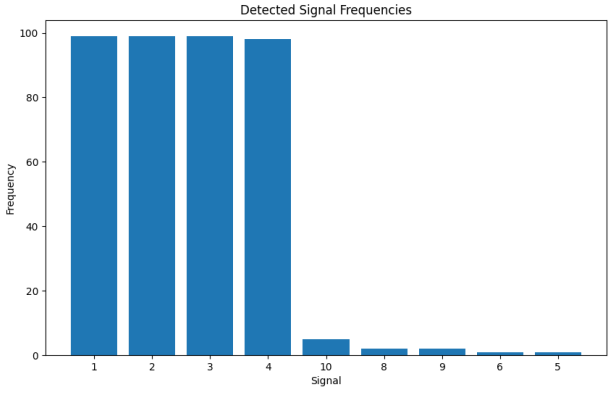


Figure 3: Frequency of different features in detected signals for Example 4.

# 5 Example 5. A heavy-tailed location problem with marginal features.

I made no modifications to the example.
In 98/100 cases, the set of detected signals is exactly equal to the actual set. The actual set of marginals is {1, 2, 3, 4}.
Here is the barplot which portrays how many times each feature was detected using our screening algorithm.

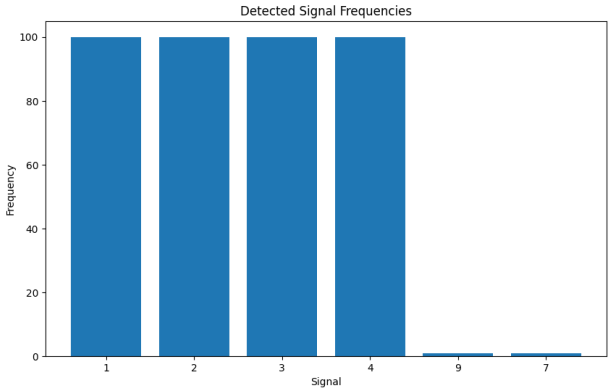


Figure 4: Frequency of different features in detected signals for Example 5.

# 6 Example 6. A heavy-tailed scale problem with marginal features.

I made the modification of changing the scaling factor of Cauchy distribution to 10 in order to improve the performance of the screening algorithm.
In 91/100 cases, the set of detected signals is exactly equal to the actual set. The actual set of marginals is {1, 2, 3, 4}.
Here is the barplot which portrays how many times each feature was detected using our screening algorithm.

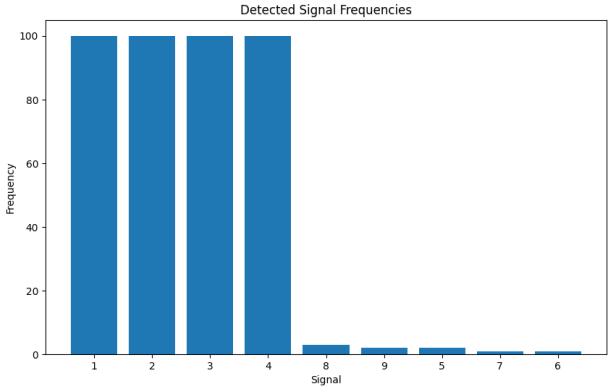


Figure 5: Frequency of different features in detected signals for Example 6.

# 7 Example 7. A location-scale problem with mixture distributions having marginal features.

I made the modification of changing the variance of noise to 0.1 in order to improve the performance of the screening algorithm.
In 81/100 cases, the set of detected signals is exactly equal to the actual set. The actual set of marginals is {1, 2, 3, 4}.
Here is the barplot which portrays how many times each feature was detected using our screening algorithm.

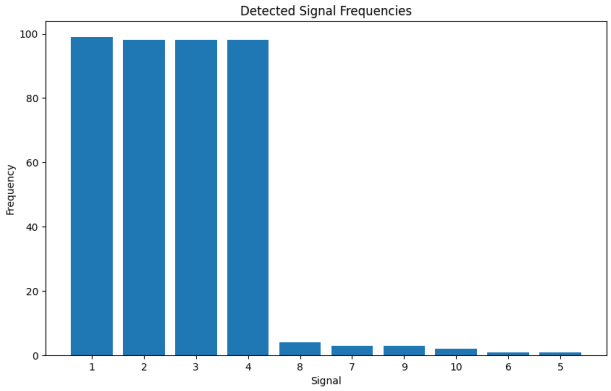


Figure 6: Frequency of different features in detected signals for Example 7.

# 8 Example 8. A scale problem with paired features.

I made the modification of changing the variance of noise to 0.01 in order to improve the performance of the screening algorithm.
In 64/100 cases, the correct set of signal pairs {1,2} and {3,4} is exactly detected in the pair column.
Here is the barplot which portrays how many times each pair of features was detected using our screening algorithm.

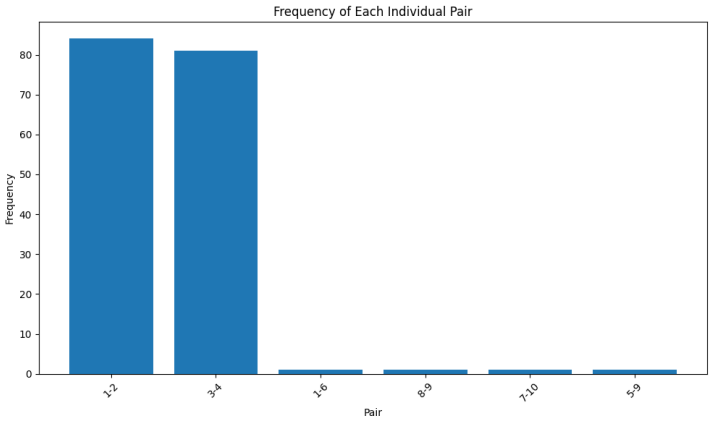


Figure 7: Frequency of detected signal pairs for Example 8.

# 9 Misclassification Rates of Each Example

The following table presents the misclassification rates for each example as percentages, based on average of 100 trials:

| **Example** | **Classifier Used** | **Misclassification Rate (%)** |
|---|---|---|
| Example 1 | MarKS | 0% |
| Example 2 | PairKS | 5.264% |
| Example 3 | MixKS | N/A |
| Example 4 | MarKS | 7.454% |
| Example 5 | MarKS | 24.246% |
| Example 6 | MarKS | 14.594% |
| Example 7 | MarKS | 3.756% |
| Example 8 | PairKS | 26.472% |

Table 1: Average Misclassification Rates as Percentages for Each Example