Supplement: Squared error-based shrinkage estimators

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1. Results for copulas

In the supplement the following results are presented:

– Figures 1-2 show MSE for mutual information (MI) with respect to copula parameters for $n = 100$, $k = 10$ and $n = 125$, $k = 5$ (the same as in the main text).

– Figures 3-5 show MSE for p with $n = 100$ and $k = 5, 15, 20$ respectively.

– Figures 6-7 show MSE for p with $k = 10$ and $n = 200, 500$ respectively.

– Figure 8 shows MSE for p with $n = 400$ and $k = 20$.

– Figure 9-10 show MSE for p with $n = 125$ and $k = 10, 15$.

– Figure 11 shows MSE for p with $n = 250$ and $k = 5$.

– Figure 12-13 show MSE for CMI with $n = 125$ and $k = 10, 15$.

– Figure 14 shows MSE for CMI with $n = 250$ and $k = 5$.
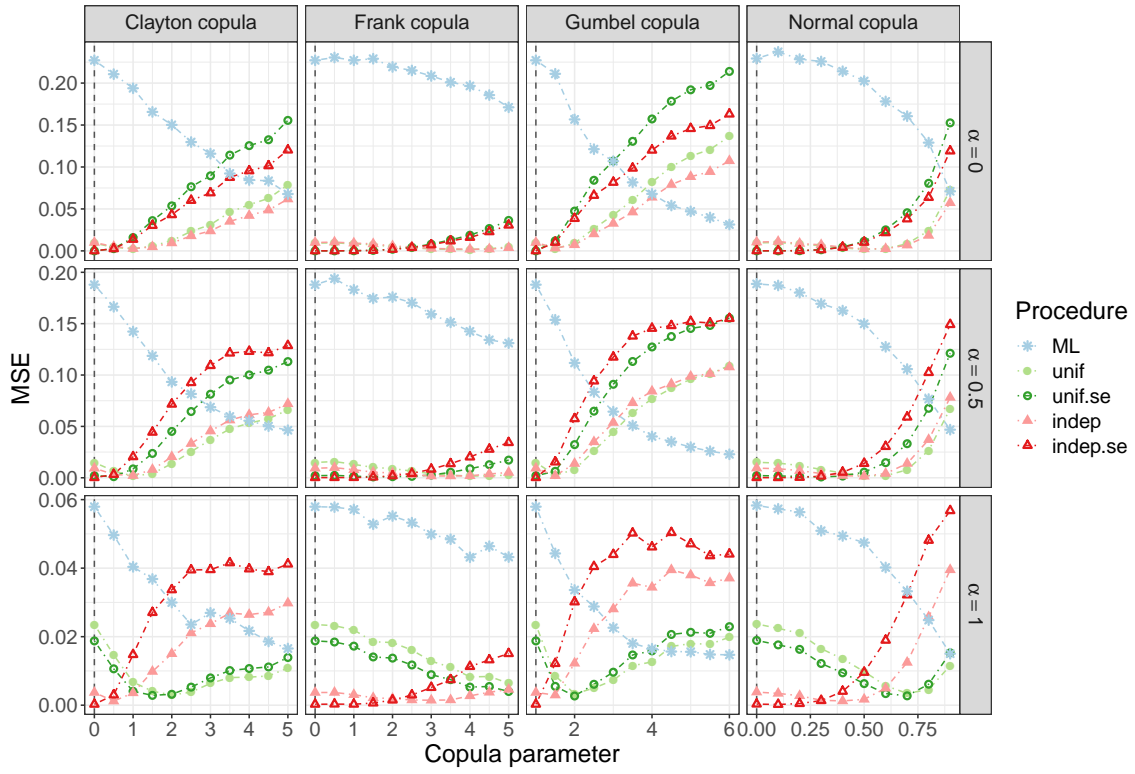
1.1. MSE for MI in two and three-dimensional case

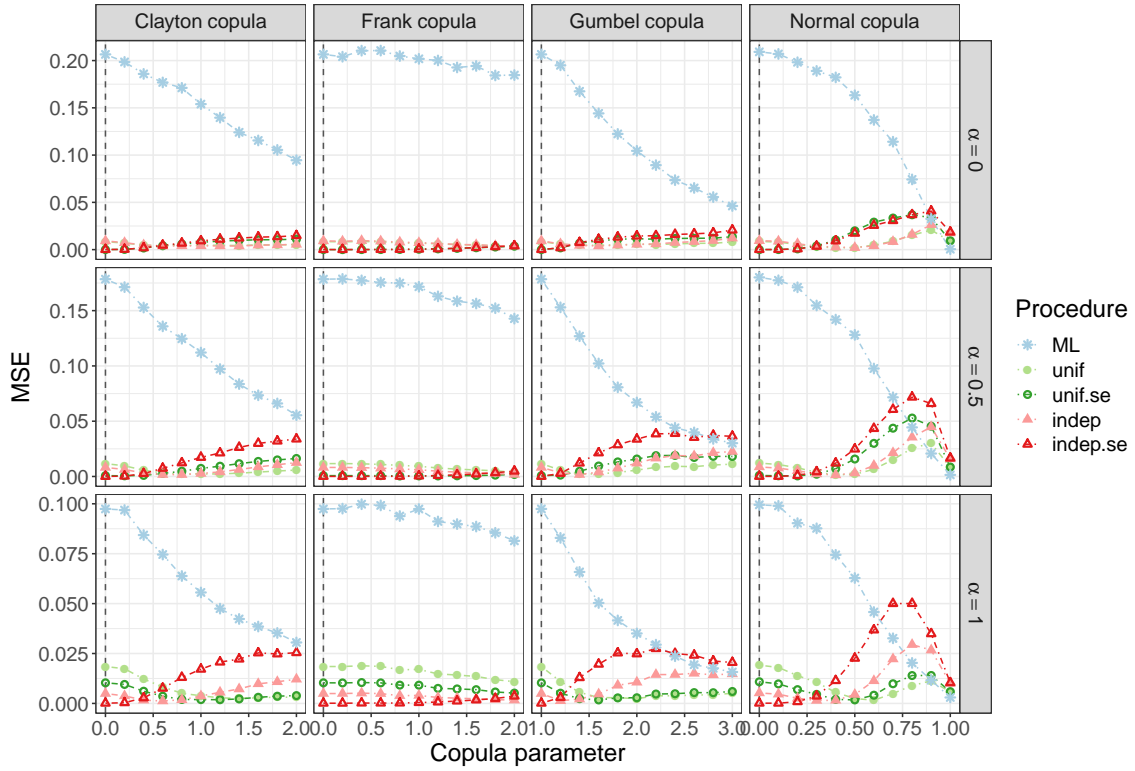Figure 1: MSE for mutual information of X and Y; $n = 100$, $k = 10$.

Figure 2: MSE for mutual information of (X, Z) and Y; $n = 125$, $k = 5$.
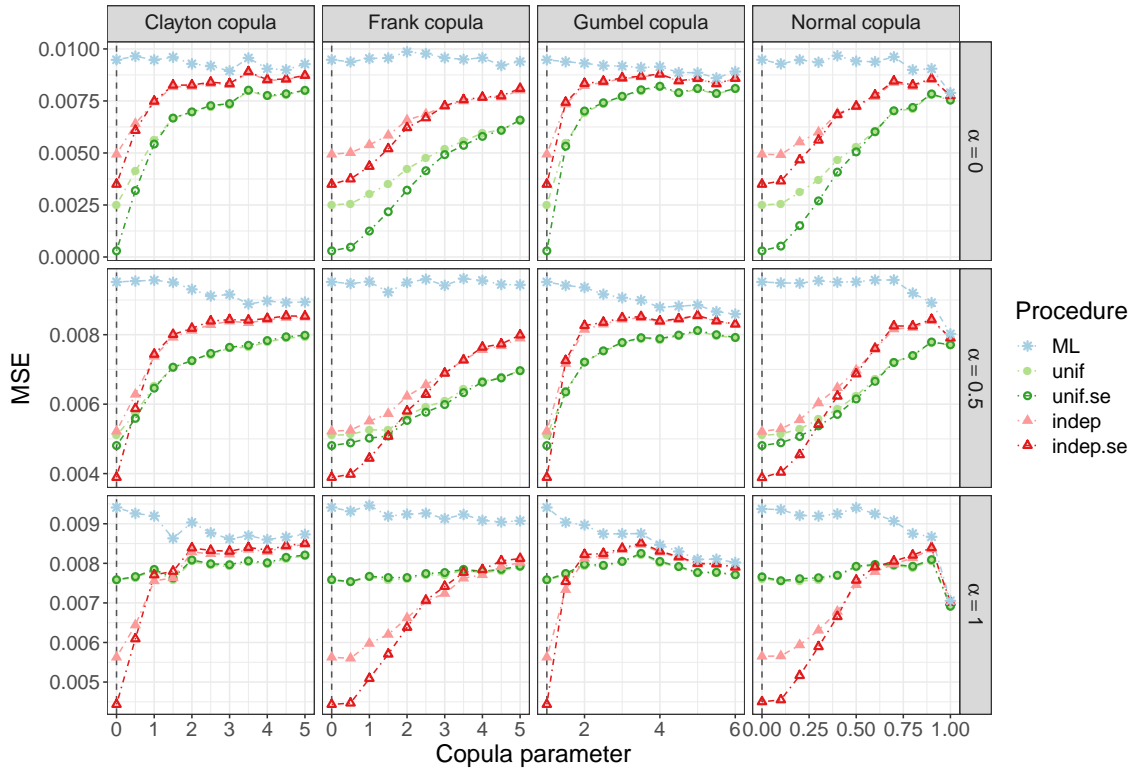
1.2. MSE for probabilities in two-dimensional case

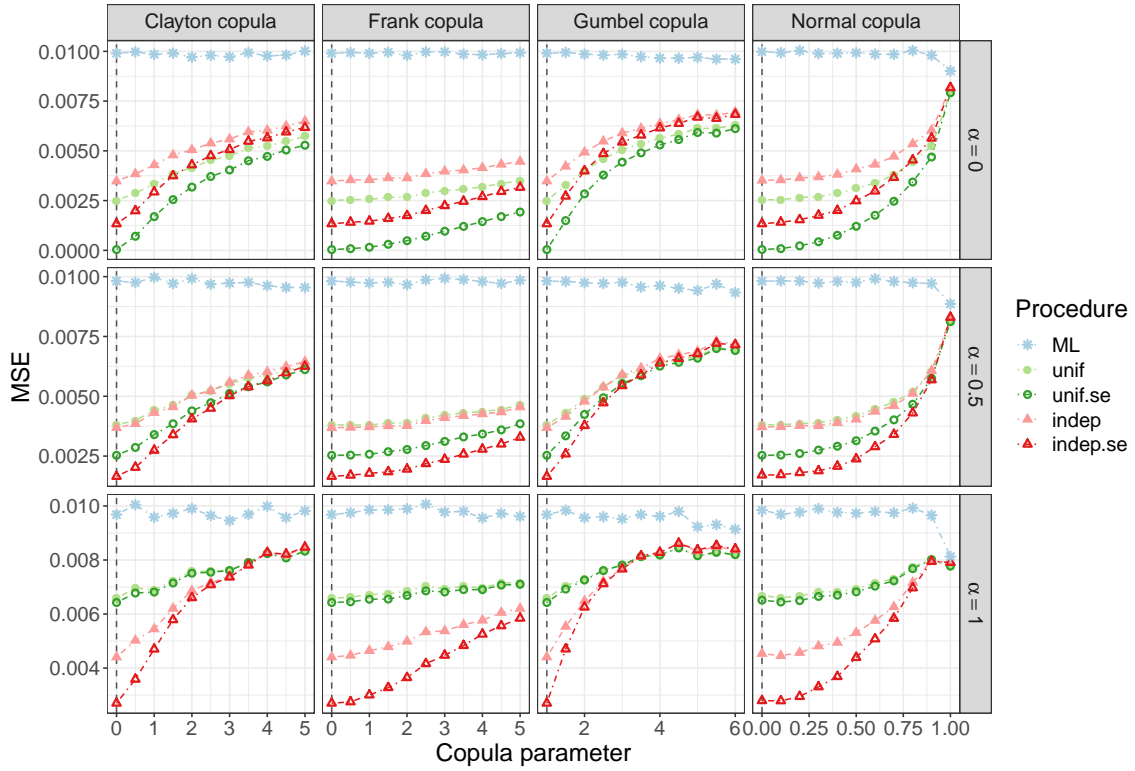
Figure 3: MSE for p; $n = 100$, $k = 5$.
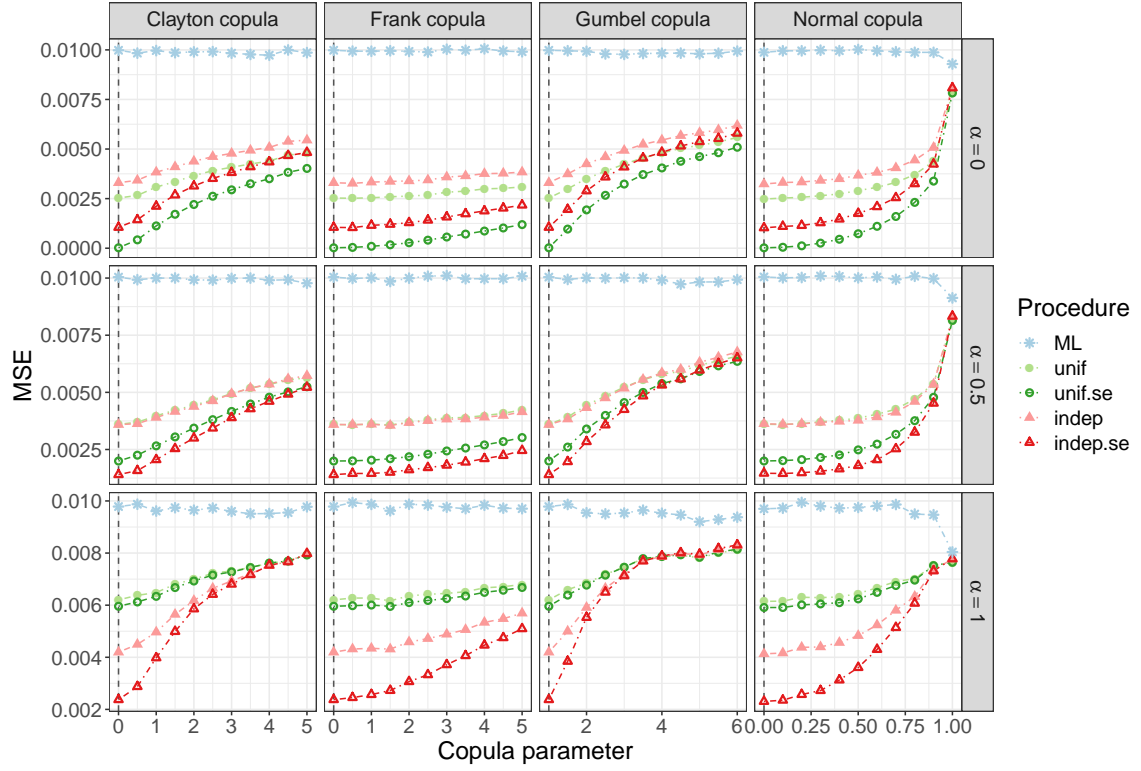

Figure 4: MSE for p; $n = 100$, $k = 15$.
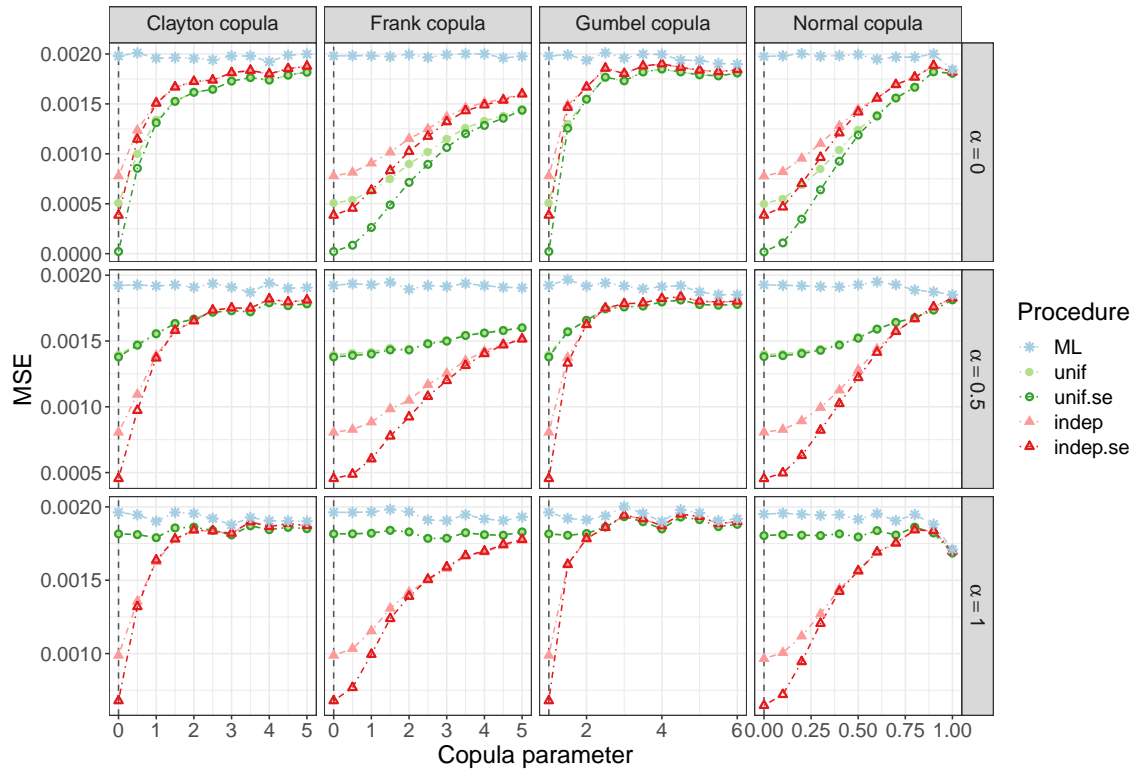
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Figure 5: MSE for p; $n = 100$, $k = 20$.

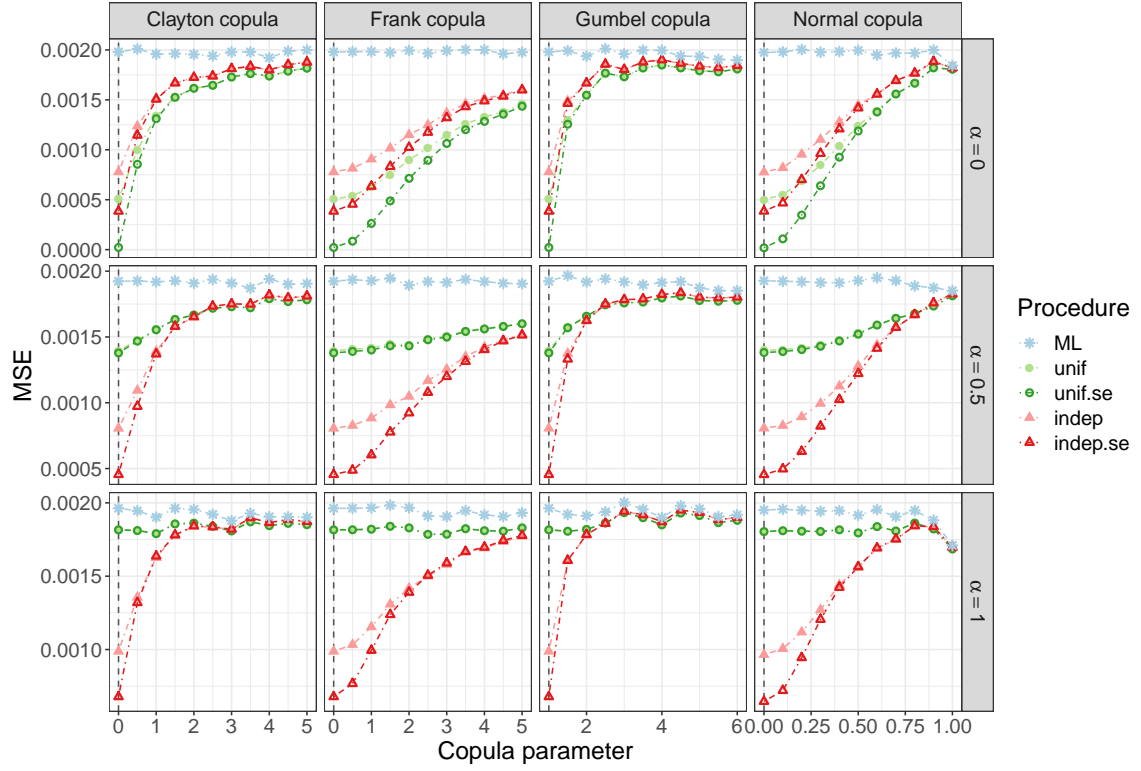Figure 6: MSE for p; $n = 200$, $k = 10$.
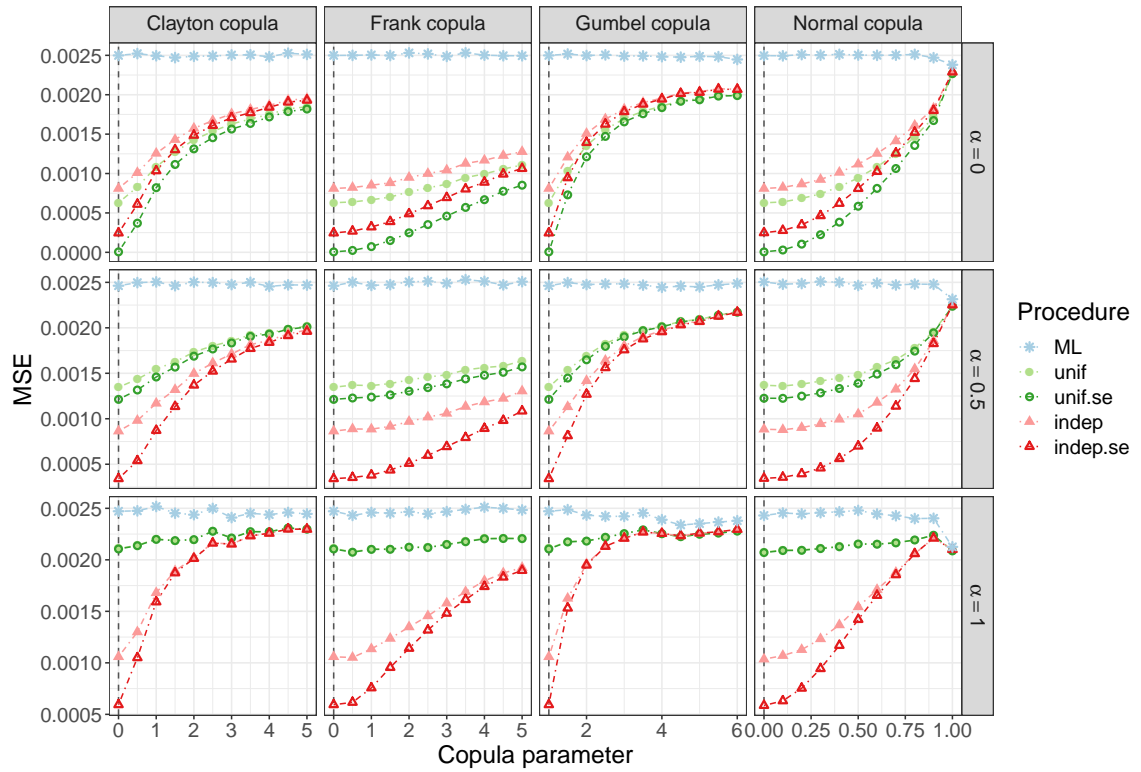
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Figure 7: MSE for p; $n = 500$, $k = 10$.

Figure 8: MSE for p; $n = 400$, $k = 20$.

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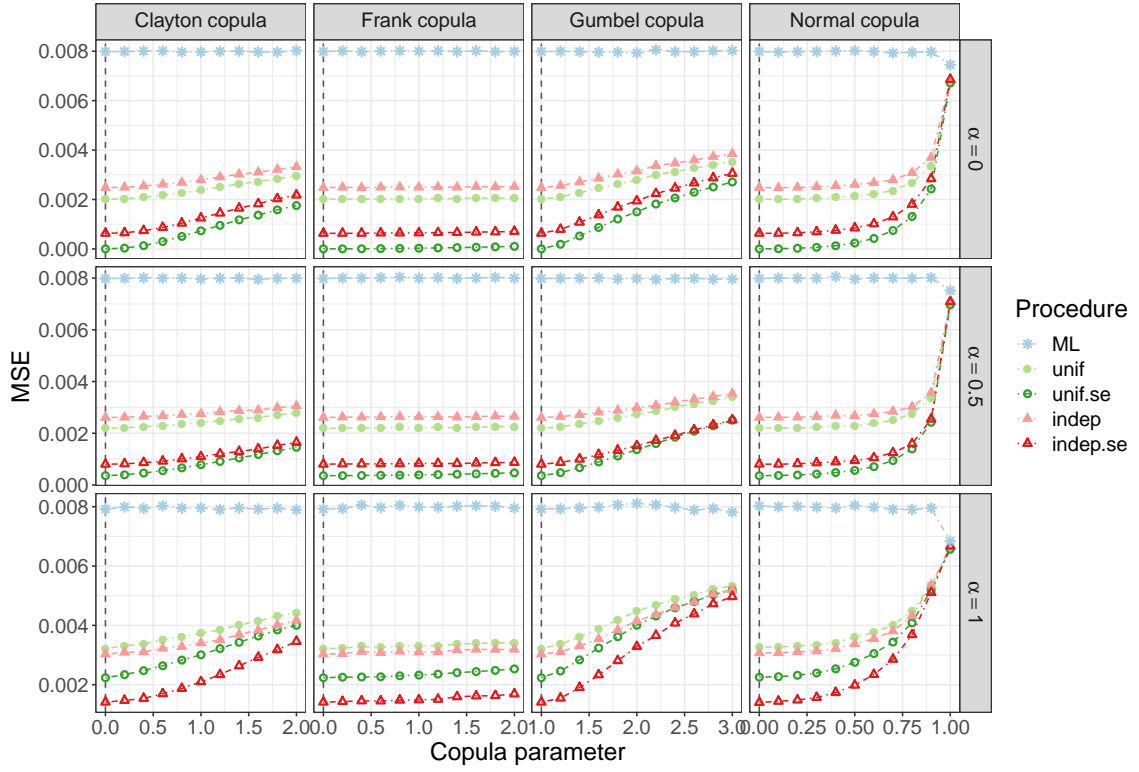## 1.3. MSE for probabilities in three-dimensional case

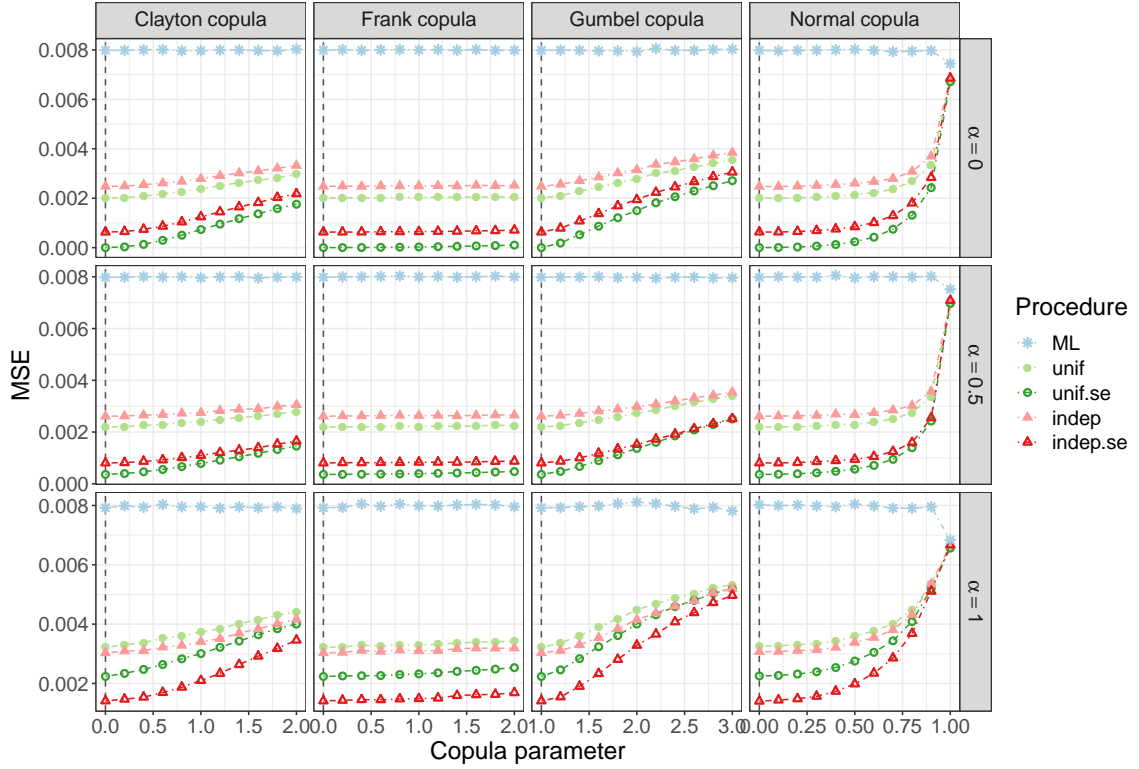Figure 9: MSE for p; $n = 125$, $k = 10$.

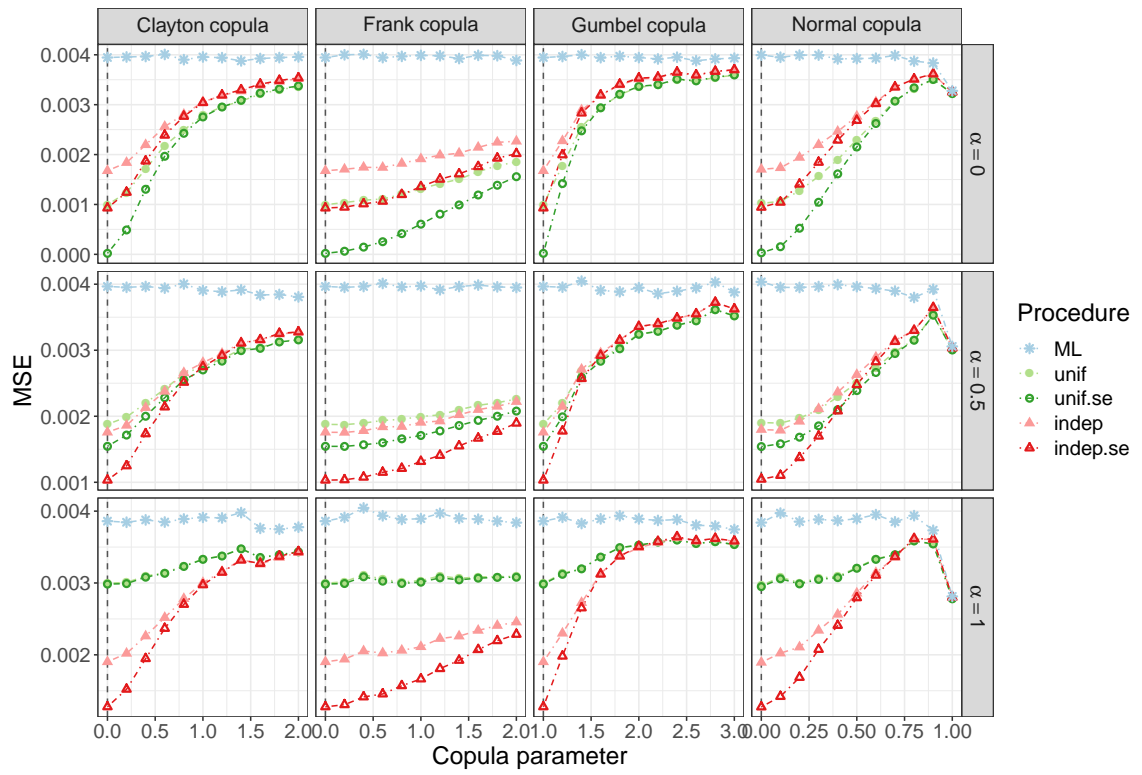Figure 10: MSE for p; $n = 125$, $k = 15$.

Figure 11: MSE for p; $n = 250$, $k = 5$.

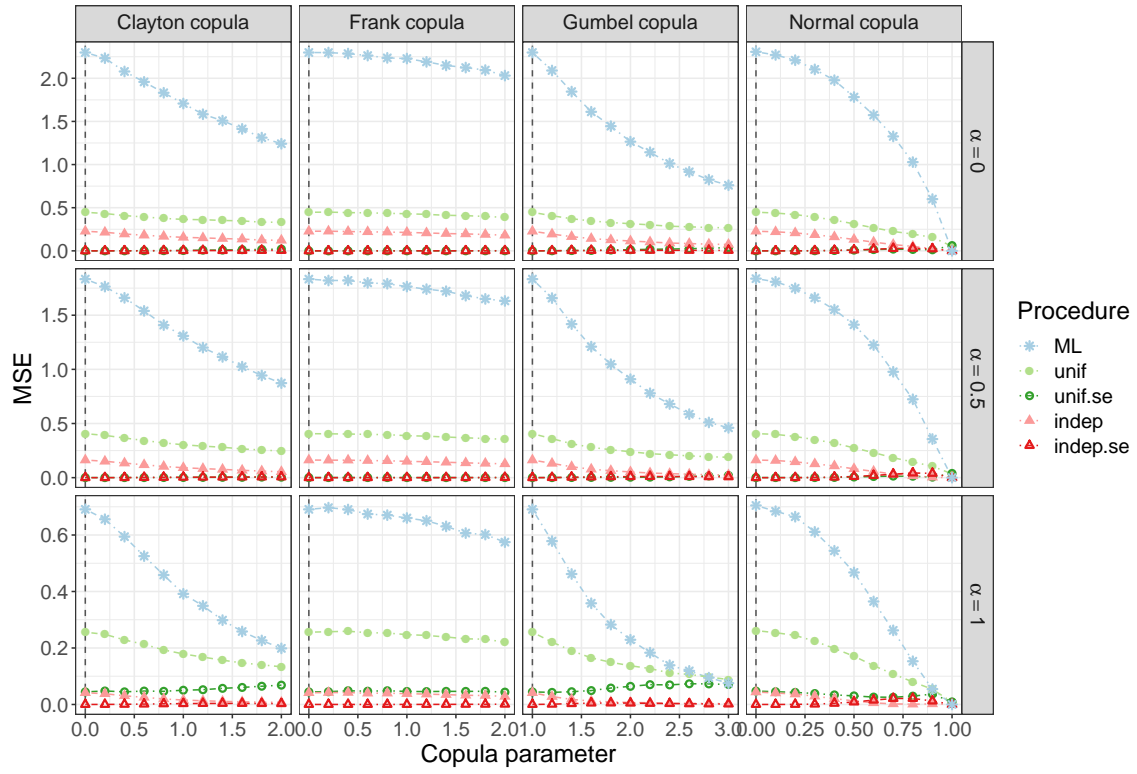## 1.4. MSE for CMI in three-dimensional case

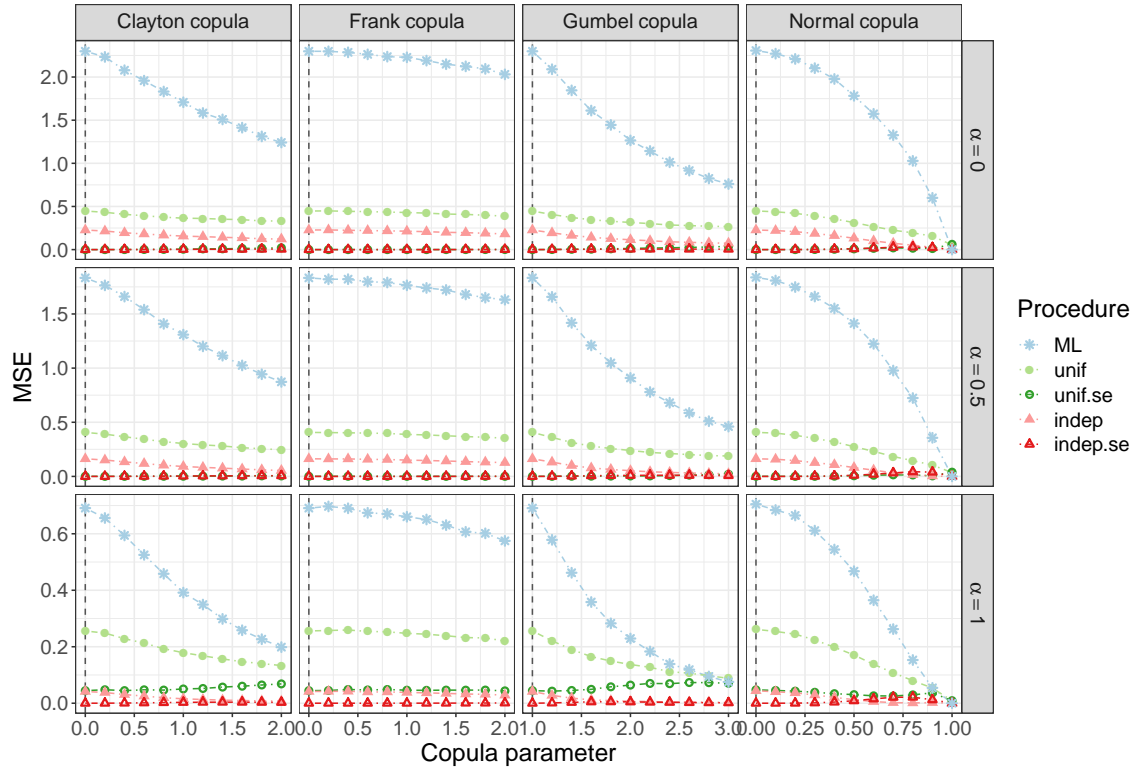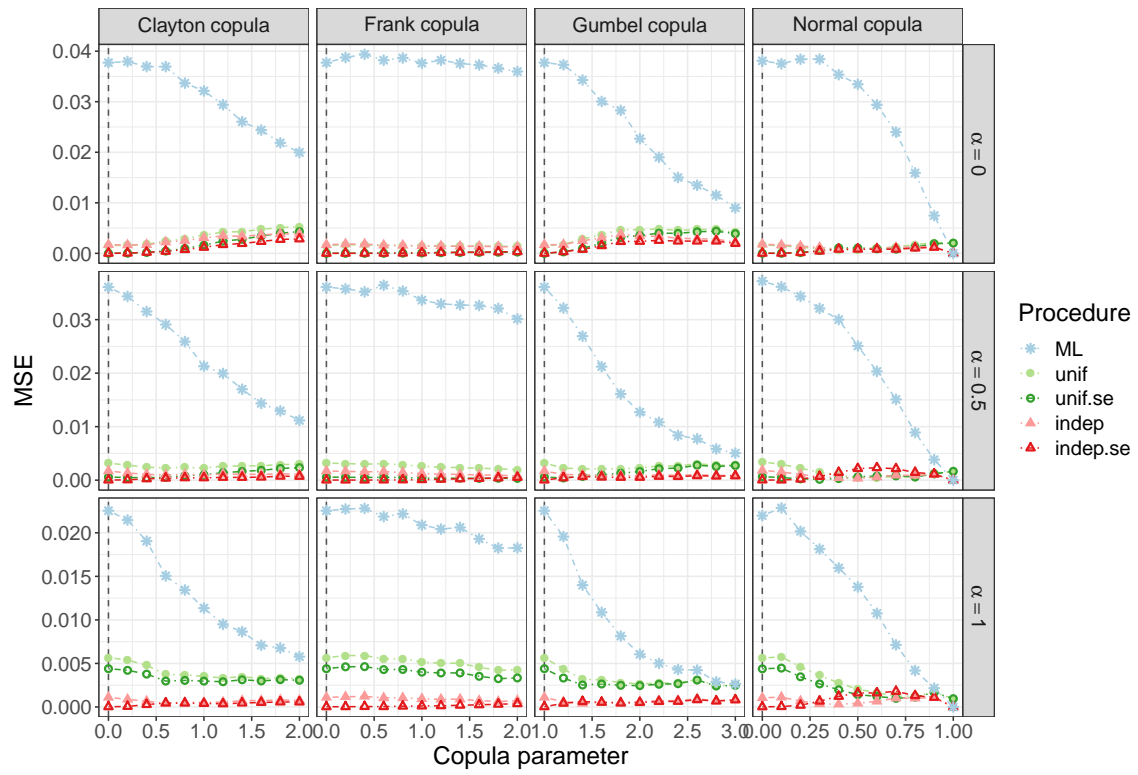Figure 12: MSE for CMI; $n = 125$, $k = 10$.

Figure 13: MSE for CMI; $n = 125$, $k = 15$.

Figure 14: MSE for CMI; $n = 250$, $k = 5$.