Supplement: Squared error-based shrinkage estimators of discrete probabilities and their application to feature selection

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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*

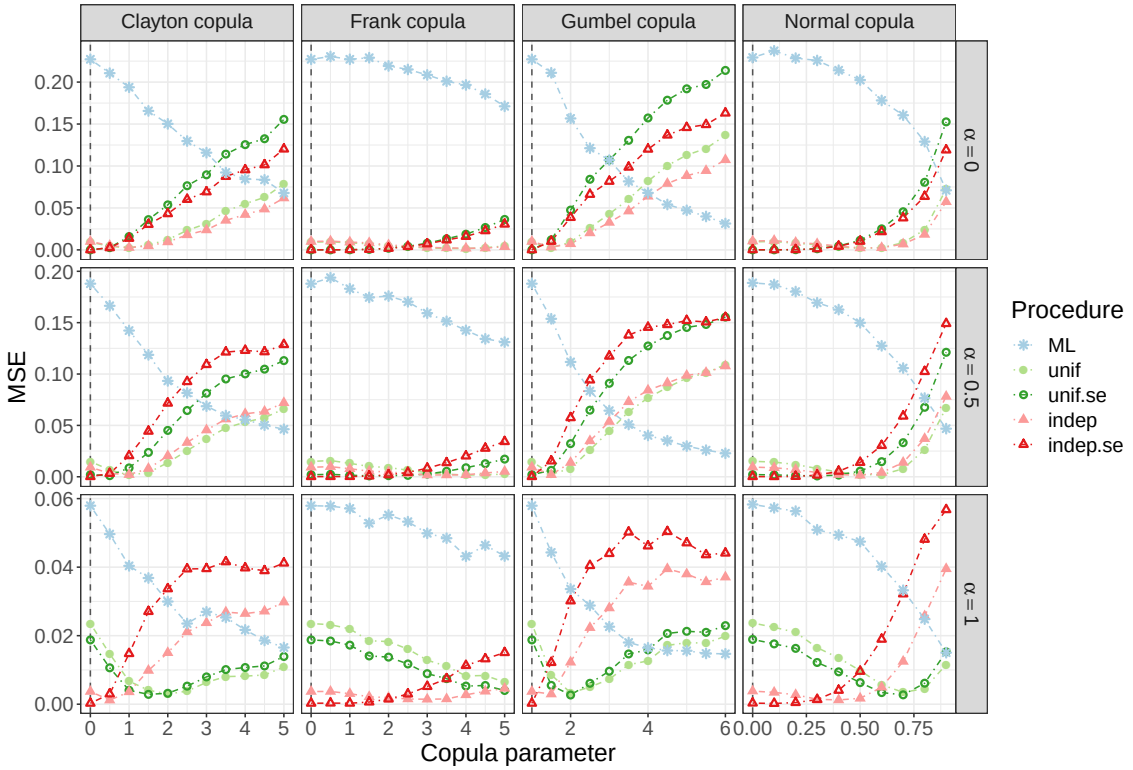

Figure 1: MSE for mutual information of X and Y; $n = 100$, $k = 10$.

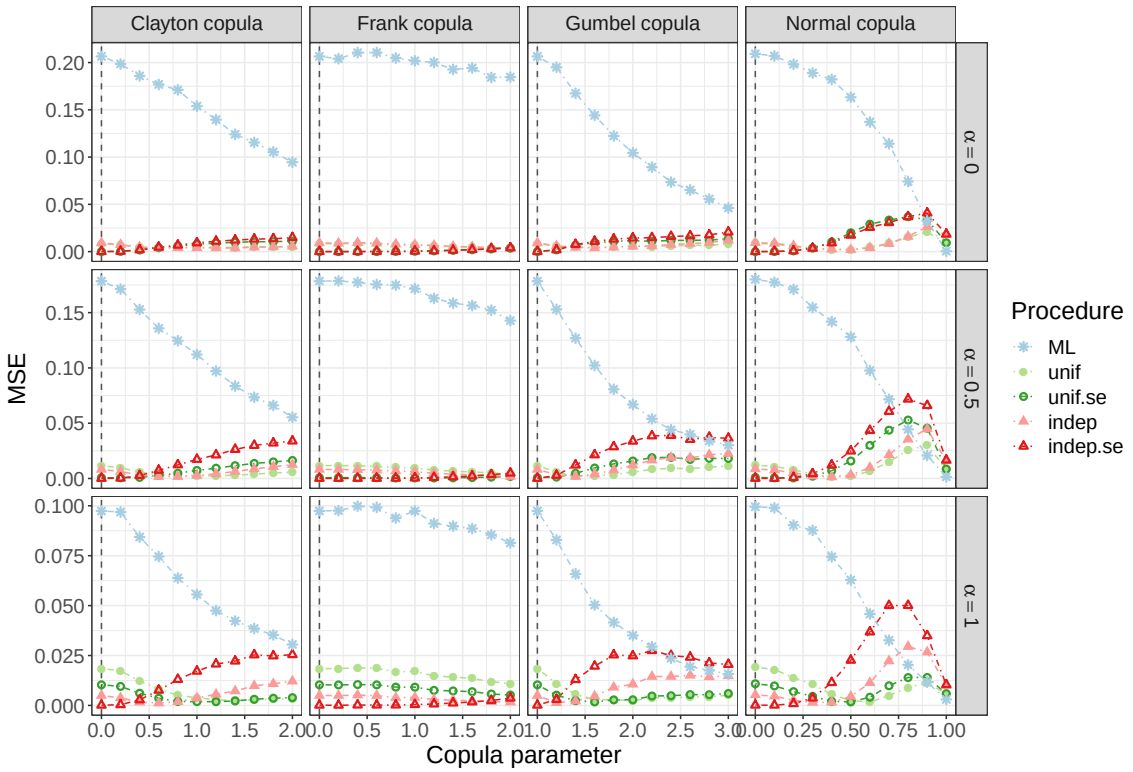

Figure 2: MSE for mutual information of (X, Z) and Y; $n = 125$, $k = 5$.

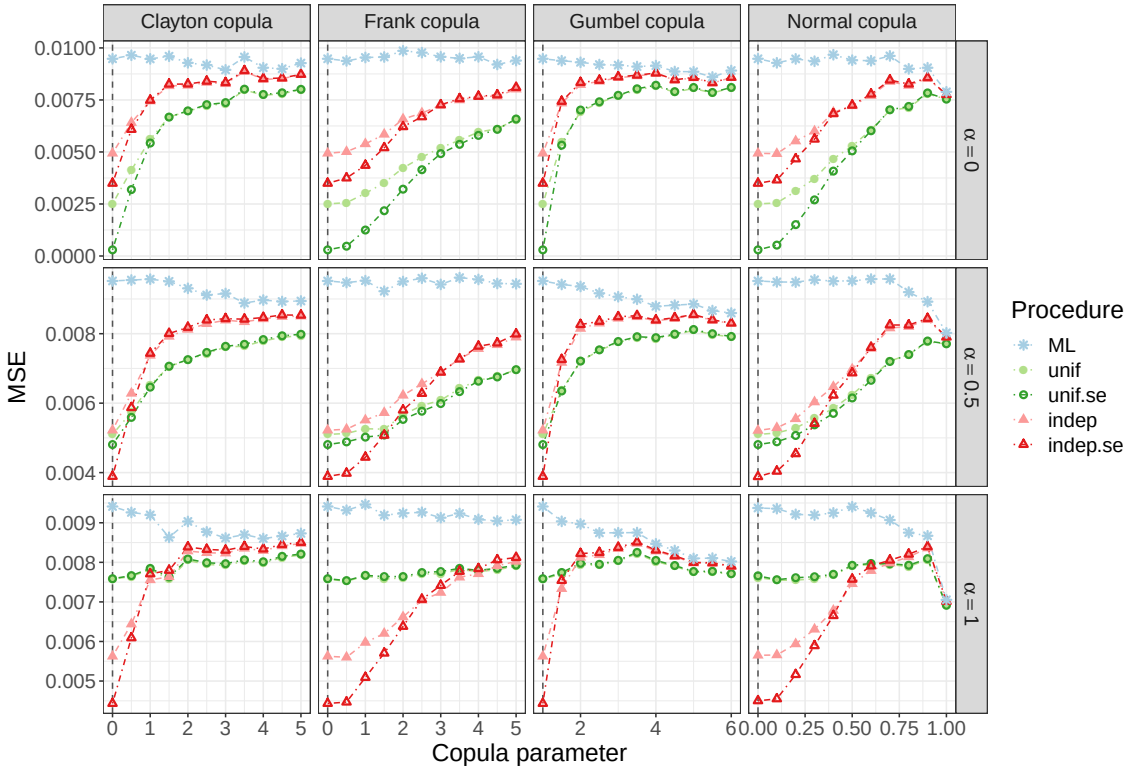

Figure 3: MSE for p; $n = 100$, $k = 5$.

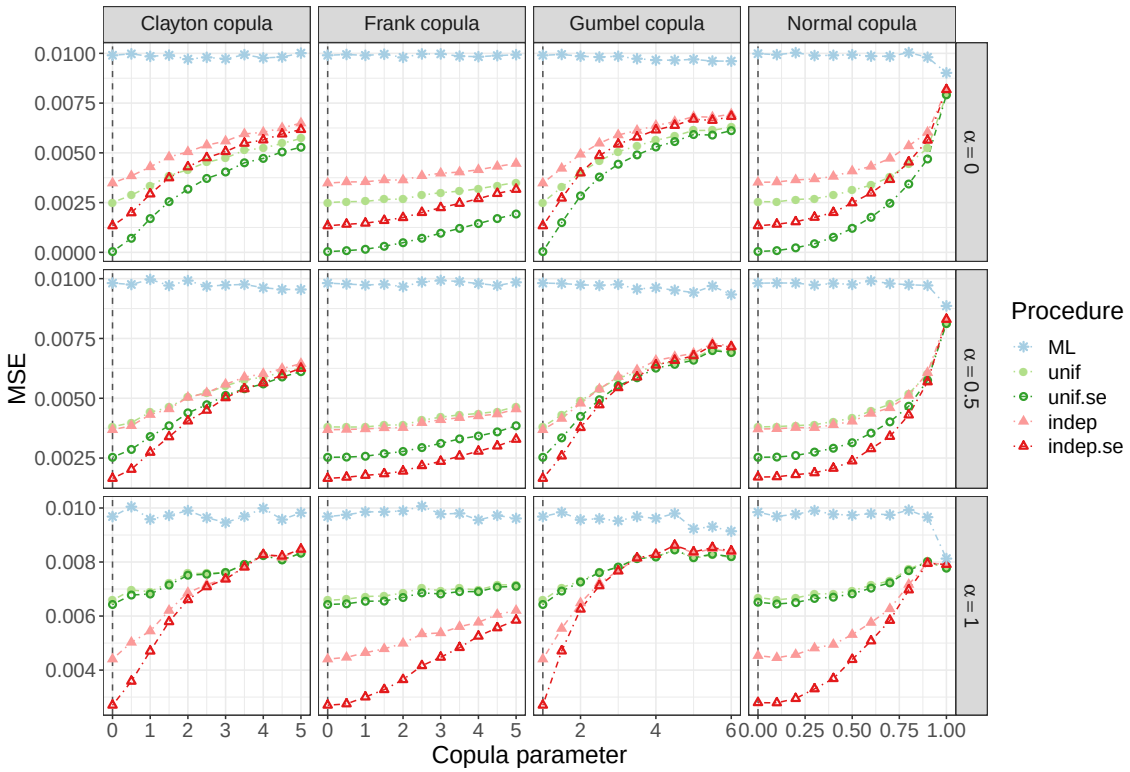

Figure 4: MSE for p; $n = 100$, $k = 15$.

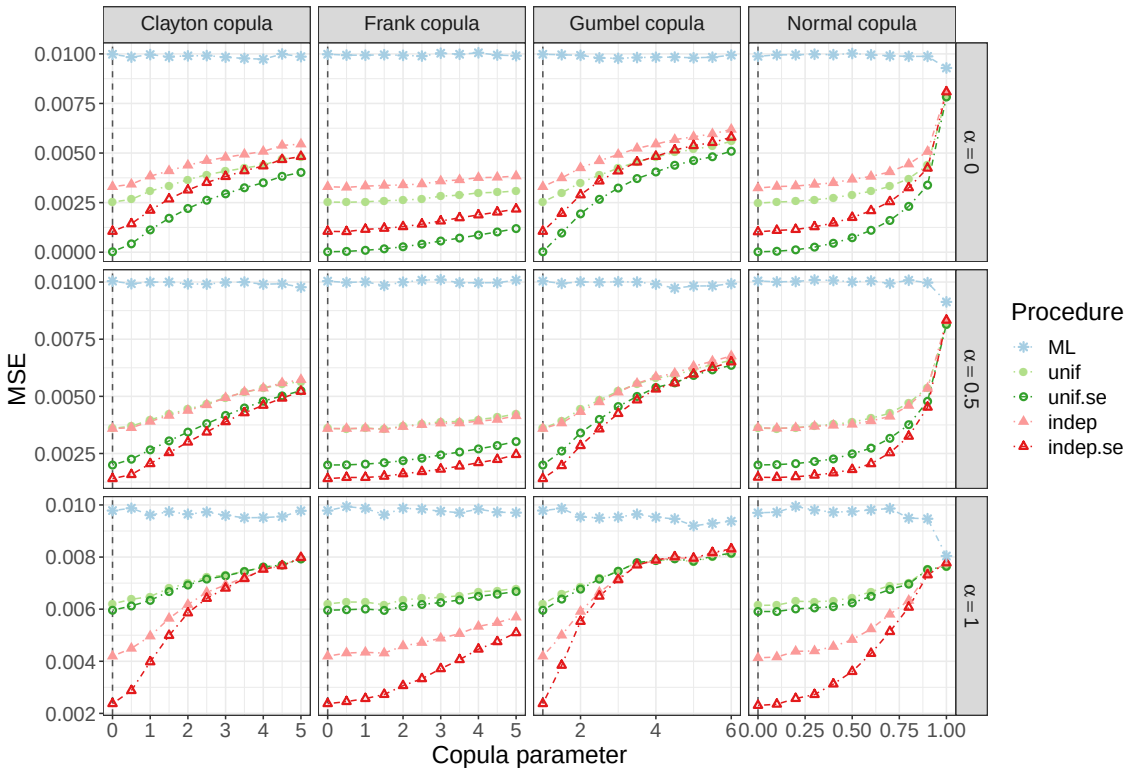

Figure 5: MSE for p; $n = 100$, $k = 20$.

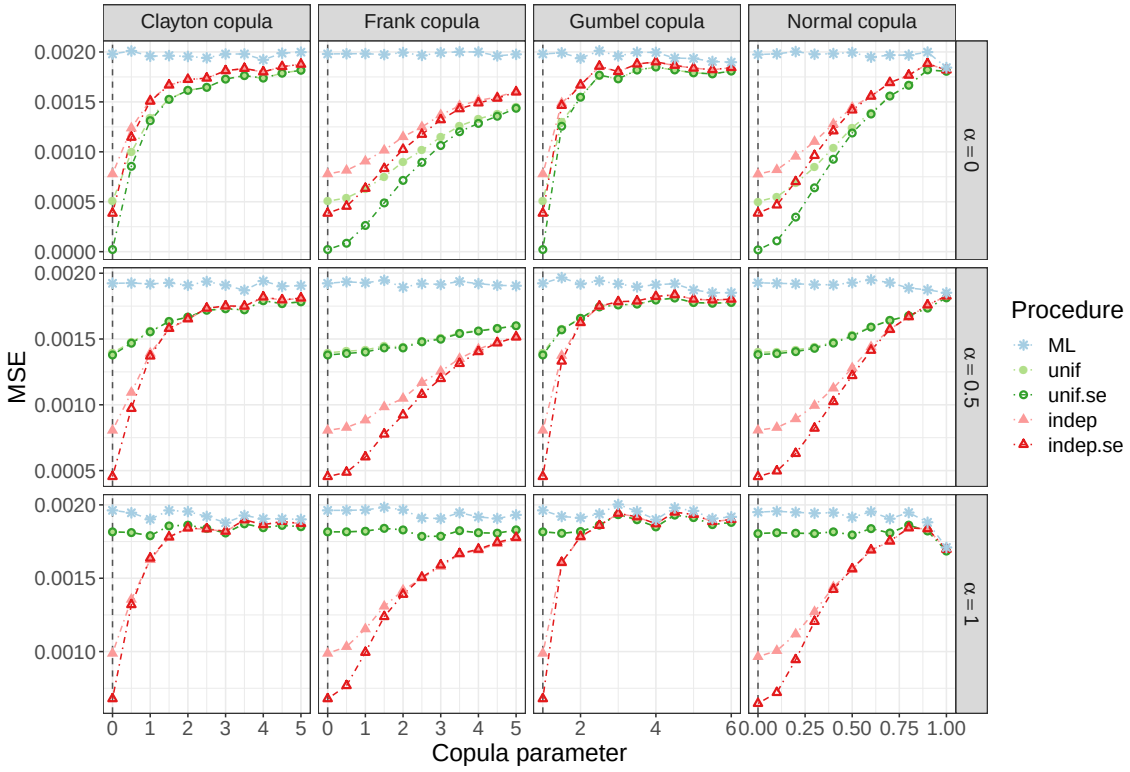

Figure 6: MSE for p; $n = 200$, $k = 10$.

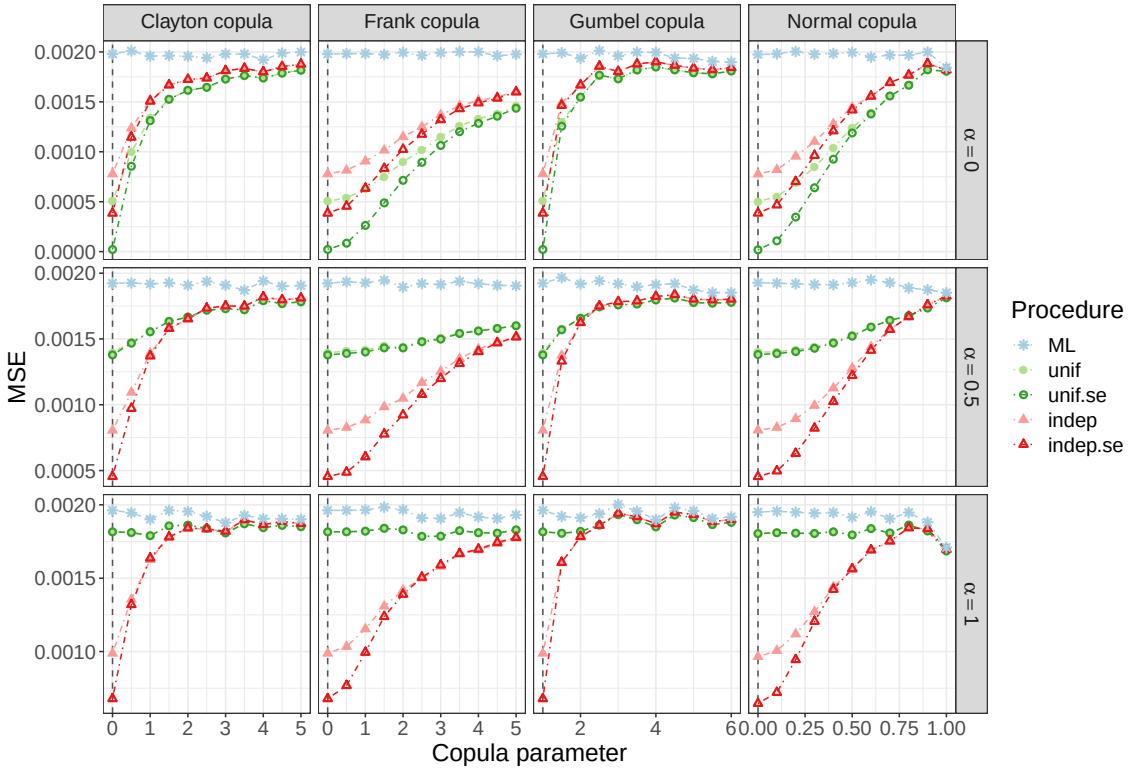

Figure 7: MSE for p; $n = 500$, $k = 10$.

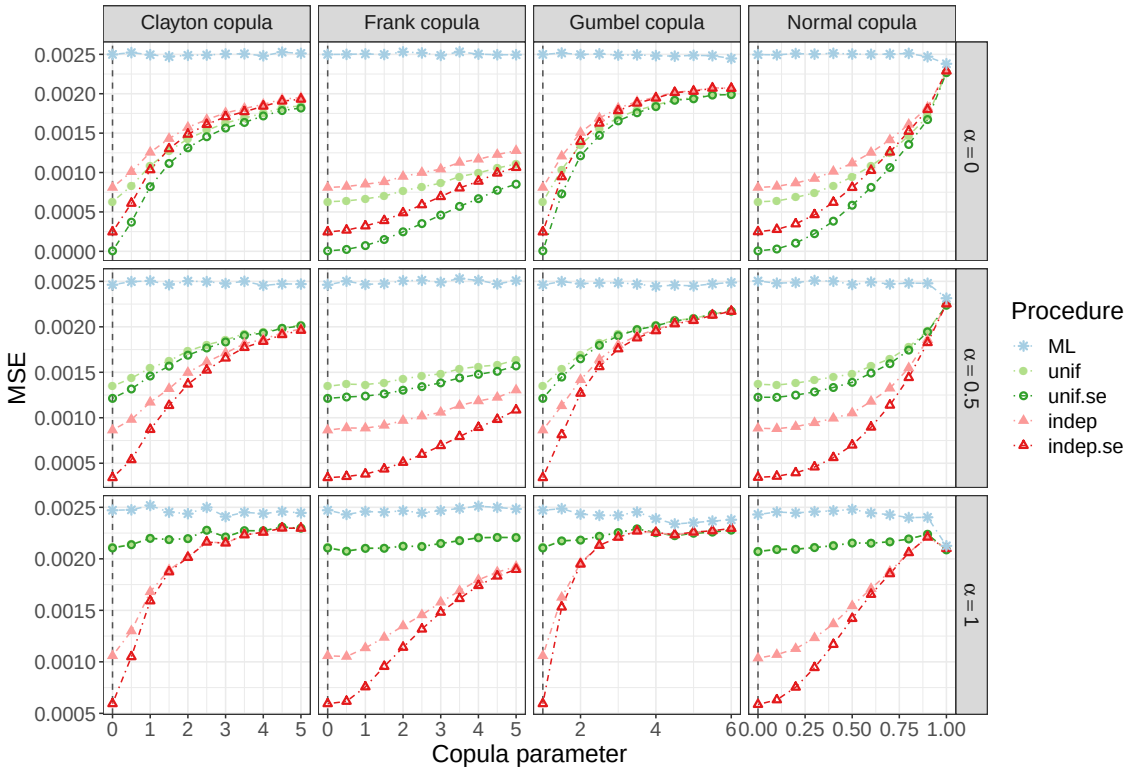

Figure 8: MSE for p; $n = 400$, $k = 20$.

1.3. MSE for probabilities in three-dimensional case

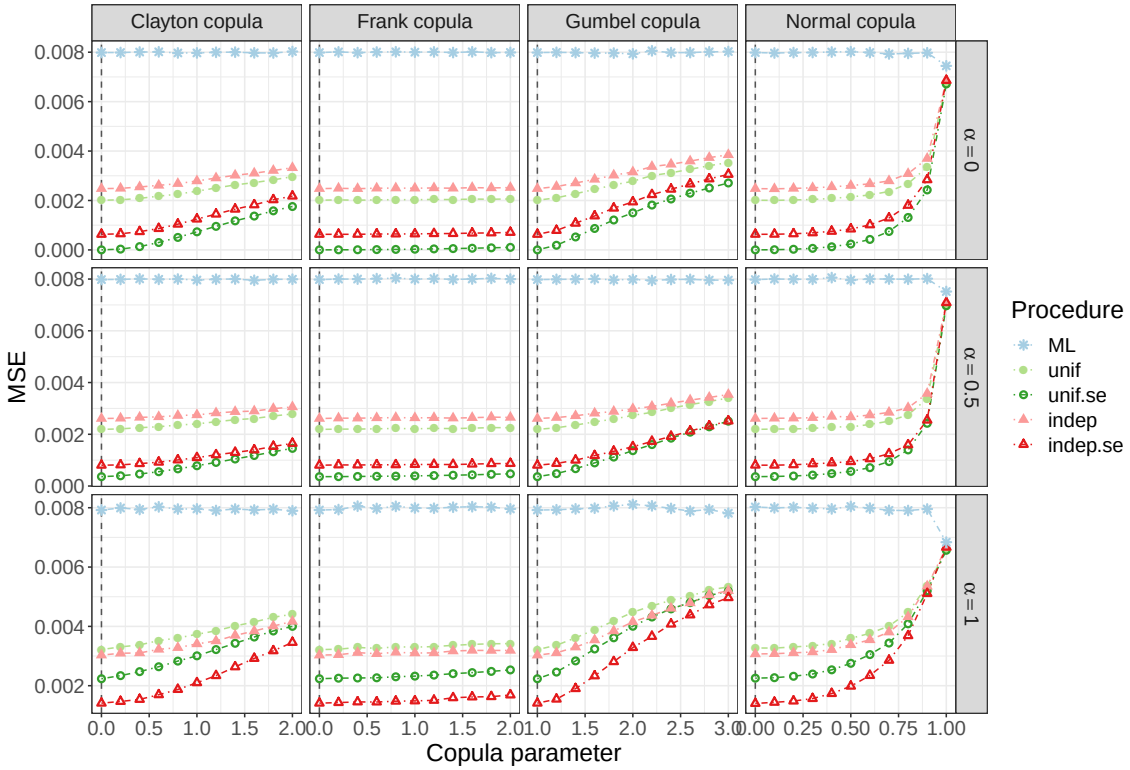

Figure 9: MSE for p; $n = 125$, $k = 10$.

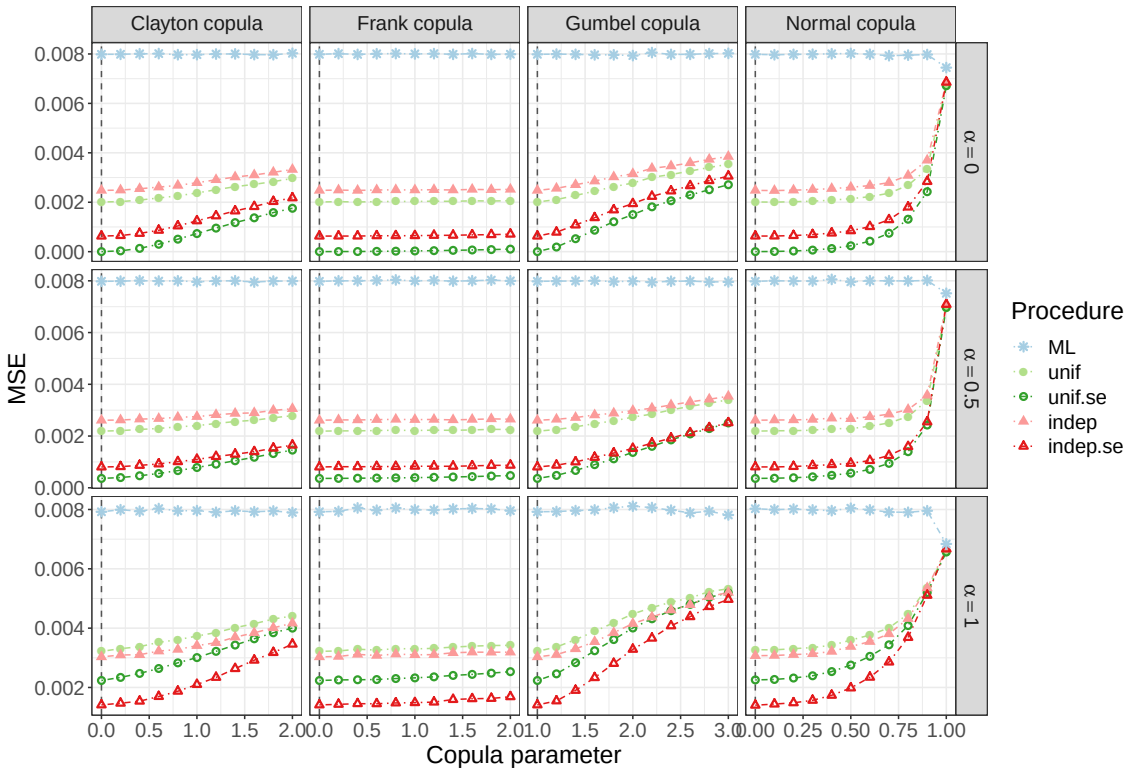

Figure 10: MSE for p; $n = 125$, $k = 15$.

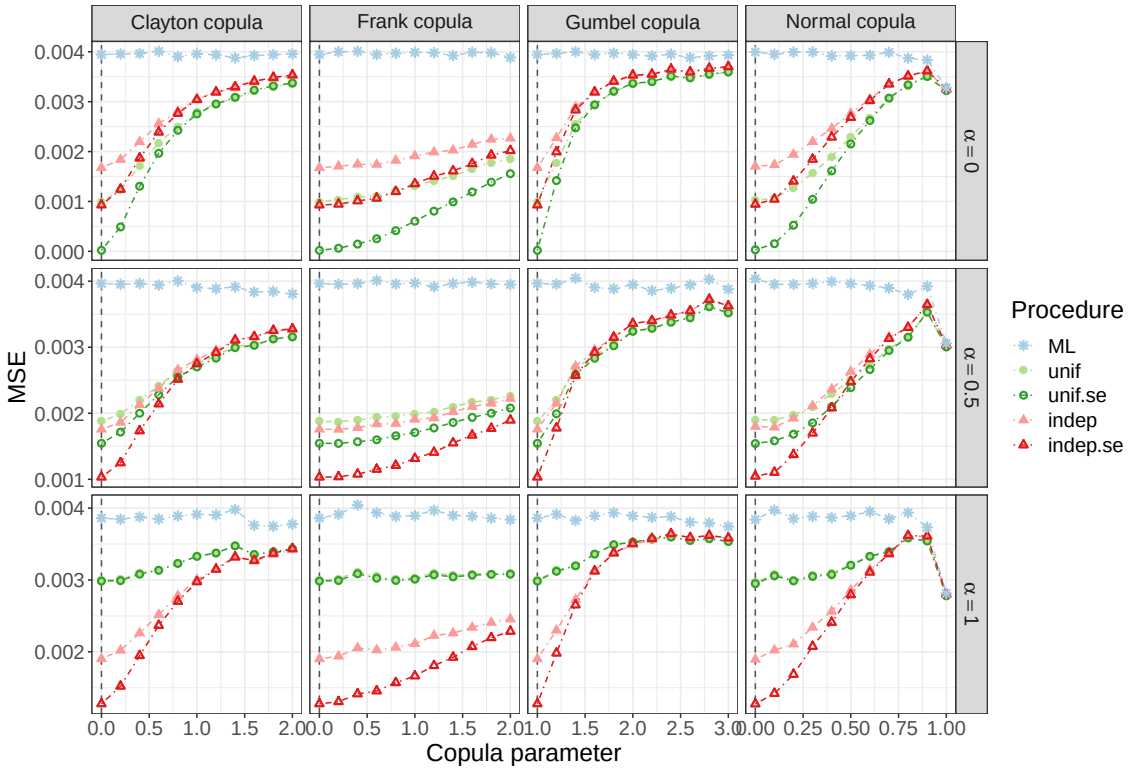

Figure 11: MSE for p; $n = 250$, $k = 5$.

1.4. MSE for CMI in three-dimensional case

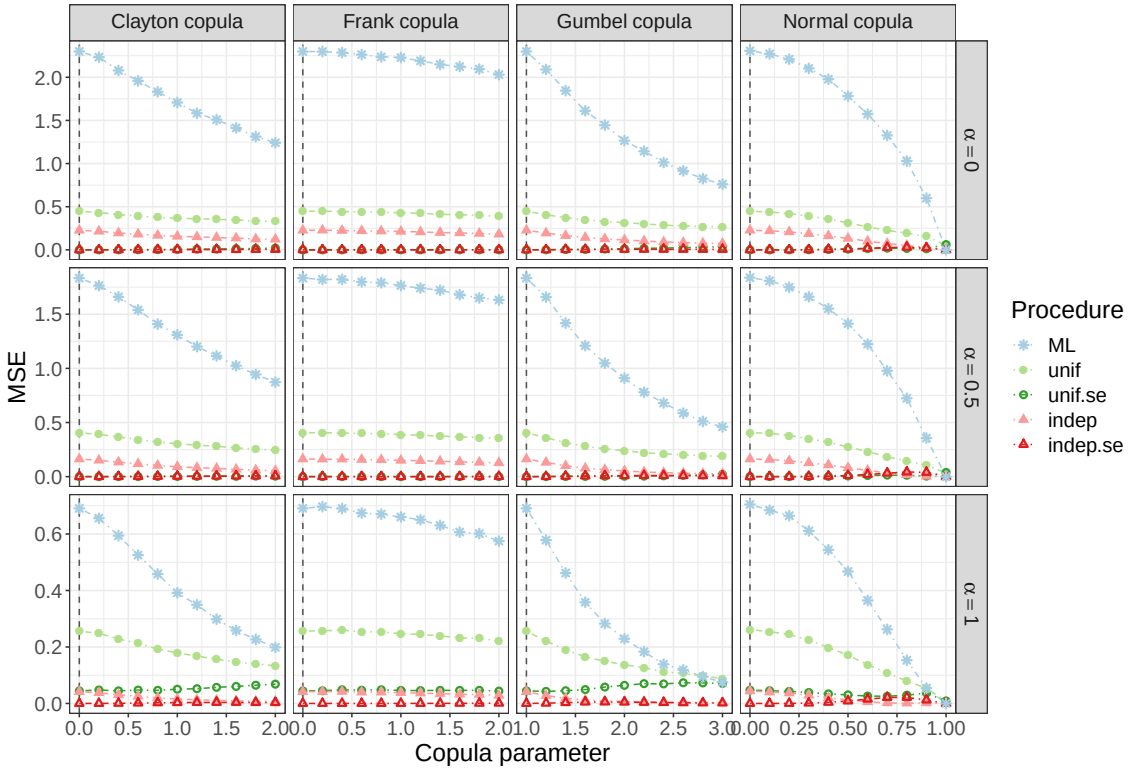

Figure 12: MSE for CMI; $n = 125$, $k = 10$.

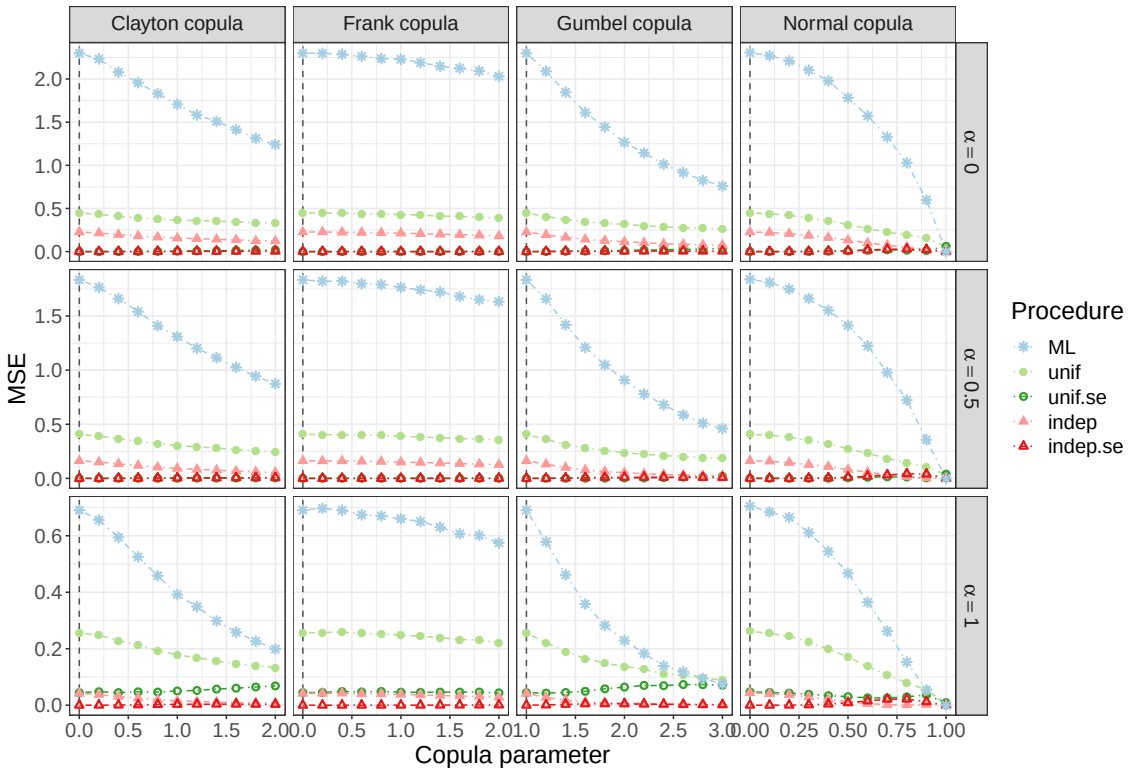

Figure 13: MSE for CMI; $n = 125$, $k = 15$.

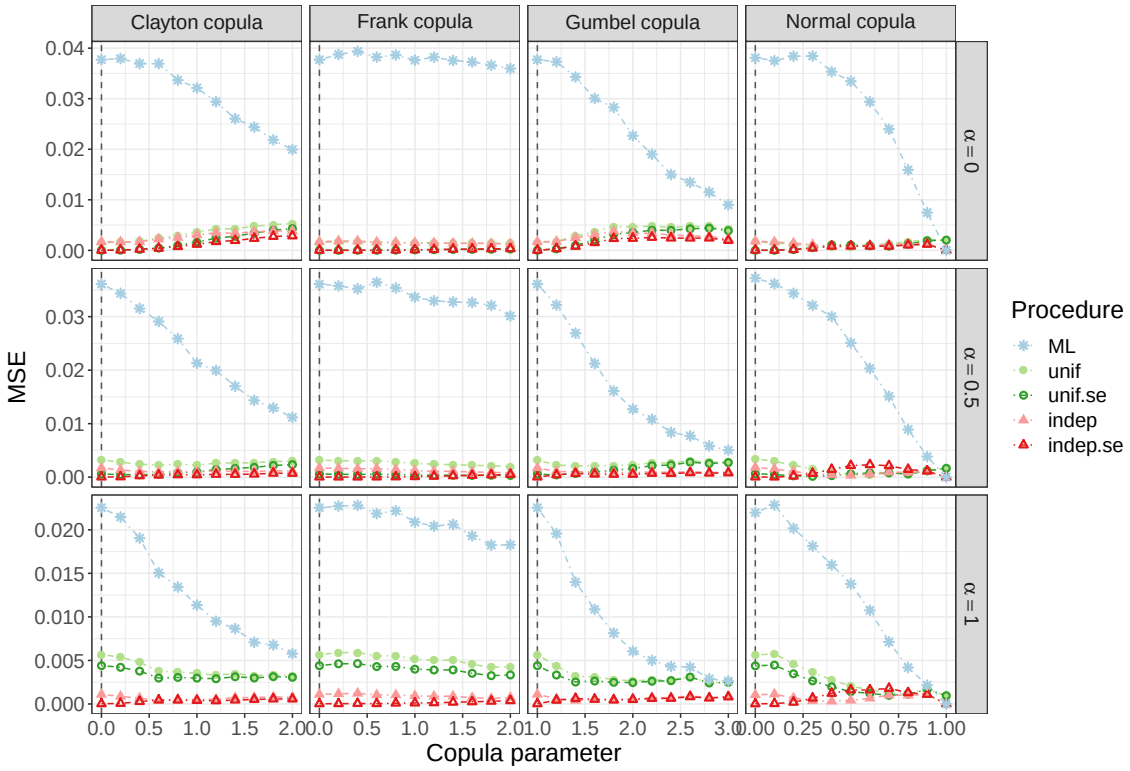

Figure 14: MSE for CMI; $n = 250$, $k = 5$.