are taking $\mathbf{B}_0 = \mathbf{0}$, the estimate of the mean squared error (MSE) is given by

$$\mathrm{MSE} = \frac{1}{1000}\left(\sum_{k=1}^{1000}\sum_{i=1}^{p}\sum_{j=1}^{q}\left(\widetilde{\mathbf{B}}_{ij}^{(k)}\right)^2\right).$$

It must be recalled that the distributions of robust estimates under contamination are themselves heavy-tailed, and it is therefore prudent to evaluate their performance through robust measures (see [11] Sec. 1.4, p. 12, and [10] p.75). For this reason, we employed both MSE, and trimmed mean squared error (TMSE), which compute the 10% (upper) trimmed average of

$$\left\{\sum_{i=1}^{p}\sum_{j=1}^{q}\left(\widetilde{\mathbf{B}}_{ij}^{(k)}\right)^2\right\}_{k=1}^{1000}.$$

The results given below correspond to this MSE, although the TMSE yields qualitatively similar results (in the uncontaminated case the results are the same).

8.2 Description of the estimators

For each case, four estimates are computed: the MLE, an S-estimate, a τ-estimate and an MM-estimate.

For the MLM, the S-estimates are defined by

$$(\widehat{\mathbf{B}}, \widehat{\mathbf{\Sigma}}) = \arg\min\{|\mathbf{\Sigma}| : (\mathbf{B}, \mathbf{\Sigma}) \in \mathbb{R}^{p\times q} \times \mathcal{S}_q\}$$

subject to

$$s^2(d_1(\mathbf{B}, \mathbf{\Sigma}), \ldots, d_n(\mathbf{B}, \mathbf{\Sigma})) = q,$$

where s is an M-estimate of scale.