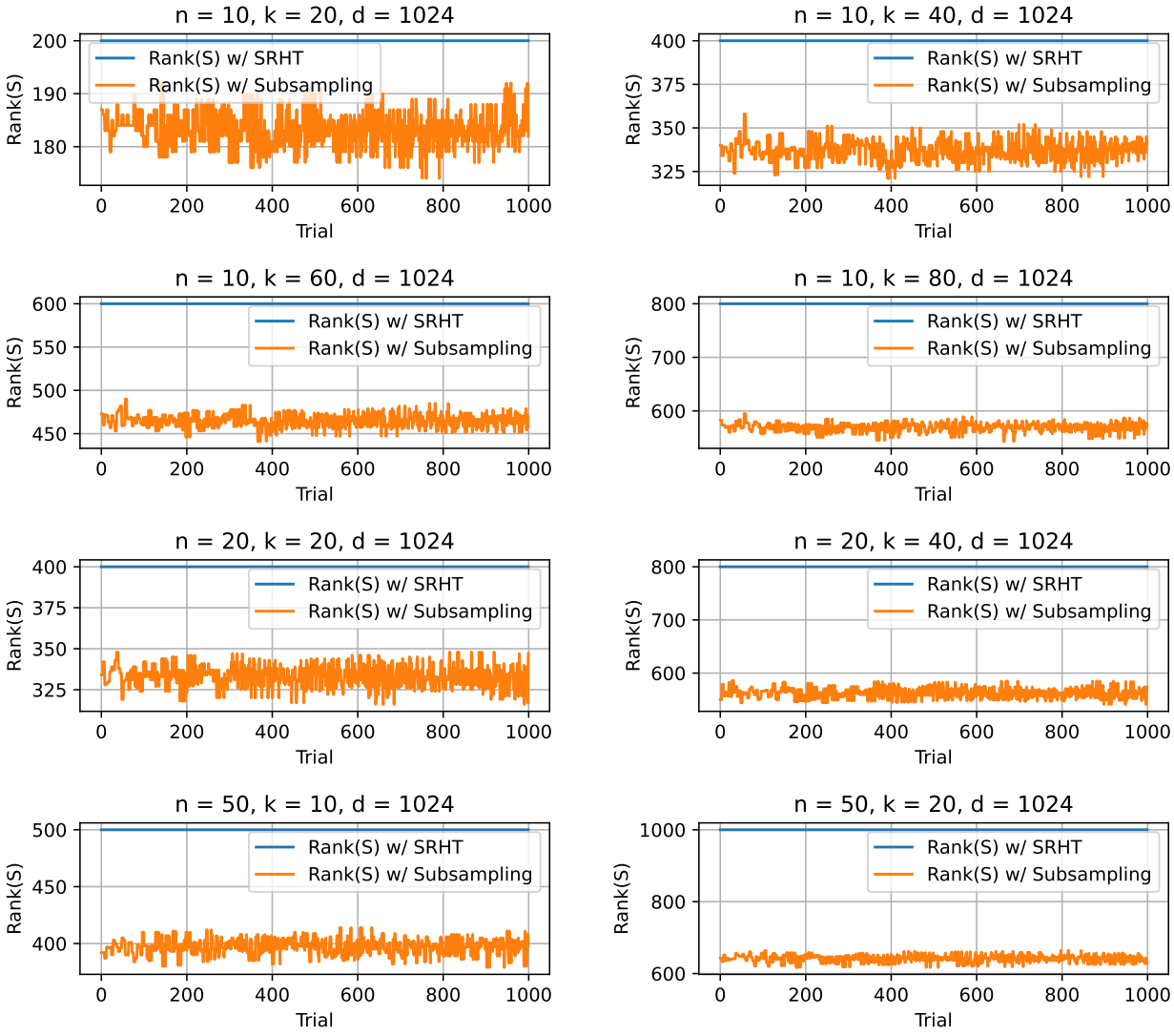

Figure 1: Simulation results of rank($\boldsymbol{S}$), where $\boldsymbol{S} = \sum_{i=1}^{n} \boldsymbol{G}_i^T \boldsymbol{G}_i$, with $\boldsymbol{G}_i$ being SRHT or $\boldsymbol{G}_i$ being the subsampling matrix. We repeat the simulation and compute the rank of $\boldsymbol{S}$ 1000 times with different n and d values. Among all results, it is not hard to observe rank($\boldsymbol{S}$) is full, i.e., $= nk$, when $\boldsymbol{G}_i$ is SRHT, all the time; while rank($\boldsymbol{S}$) $< nk$, when $\boldsymbol{G}_i$ is the subsampling matrix, all the time. Since the higher rank $\boldsymbol{S}$ is, the lower the MSE is. This is an evidence showing the superior performance of Rand-Proj-Spatial with $\boldsymbol{G}_i$ being SRHT compared to the baseline Rand-k-Spatial with $\boldsymbol{G}_i$ being subsampling matrix.