To compare the shrinkage-PHDF and the PHDF clearly, Figs. 8 and 9 show the comparison of the mean OSPA for varying SNRs. The SNR of the targets is set to known values between 6 and 13 dB. When the value is between 6 and 11 dB, the shrinkage-PHDF performs significantly better than the PHDF. When the value is large than 11 dB, they perform similarly. This finding illustrates the limitation of ordinary the PHDF for TBD: the PHD cannot sufficiently approximate the multitarget posterior probability when the SNR is low. The superiority of the shrinkage-PHDF takes advantage of the shrinkage operation is indicated, especially for low SNR scenarios. It is clear that for multitarget TBD, the shrinkage-PHDF performs better than the PHDF and MPF, especially when the SNR is low.

Fig. 8 Comparison of the estimation errors of position given by the time-averaged OSPA miss distance with a measurement resolution $R=50$ m for varying SNRs.

Fig. 9 Comparison of the estimation errors of the velocity given by the time-averaged OSPA miss distance with a measurement resolution $D=25$ m/s for varying SNRs.