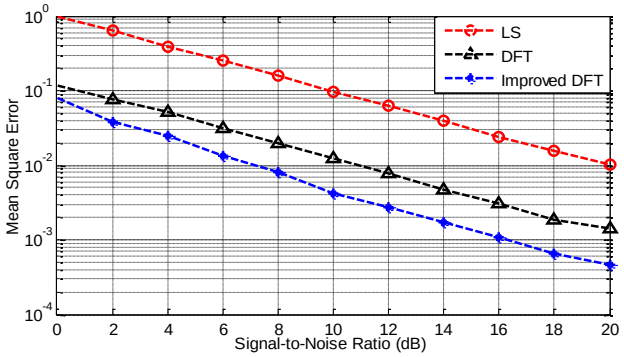

Fig. 4 Mean square error comparison with α =0.15

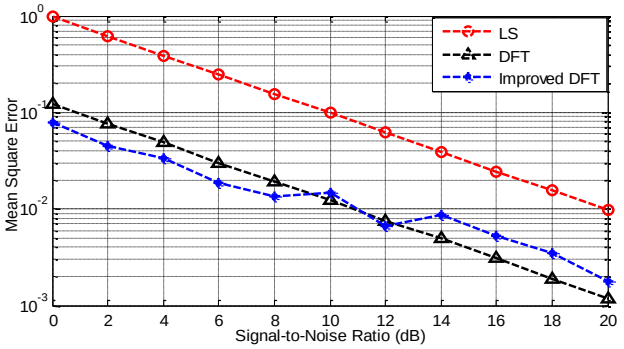

Fig. 5 Mean square error comparison with α =0.35

Fig. 6 and fig. 7 are the frequency response and magnitude error of different estimation methods respectively with α =0.15, SNR=5dB. Comparing both frequency response and magnitude error, it's obvious that estimation based on improved DFT algorithm got minimum deviation with real value, and which is 4 times lower than LS estimation algorithm. Thus we conclude that, the improved algorithm we proposed has superior estimation performance compared with existed methods, and can be applied to estimate channel in tunnel environment.

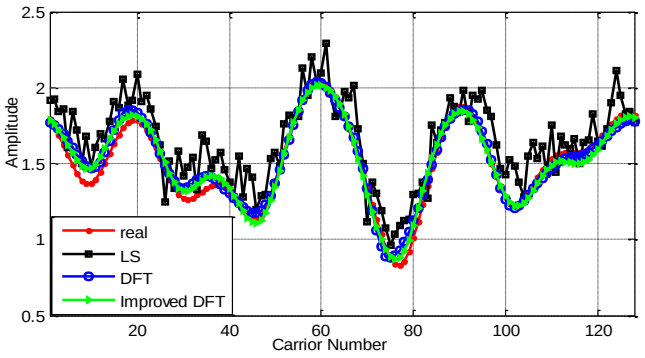

Fig. 6 Frequency response estimation of different methods

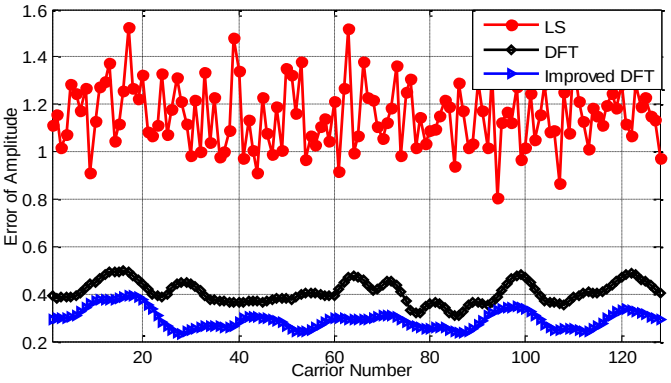

Fig. 7 Magnitude error of different estimation methods

VI. Concluthsion

In this paper, we have proposed an improved LS channel estimation algorithm based on DFT time domain filtering to estimate channel in tunnel environment. The improved algorithm can reduce noises inside protection interval by using a dynamically changed parameter and get better performance in low signal-to-noise ratio. Because DFT can be realized through IFFT/FFT technology, so the improved algorithm also preserves the easy implementation and low complexity characteristics of the LS algorithm. In conclusion, the improved algorithm has good practical value and is suitable for tunnel environment channel estimation in low SNR conditions.

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