that the proposed Modified MUSIC and Nyström method based MUSIC algorithms have almost similar performance as compared to existing methods.

3.3 Complexity of computation

The conventional MUSIC requires $O(M^3)+O(M^2K)$ flops to compute SVD of SCM. Whereas proposed Nyström based MUSIC method computes SVD of SCM without computing SCM. Hence it requires $O(Mm^2+Mm)$ flops, provided that $m<M$. The complexity of commutation for five mentioned MUSIC algorithms versus number of array elements is shown in figure 5. Time complexities of all methods are processed using intel i3-3110M CPU with 2.40GHz capacity.

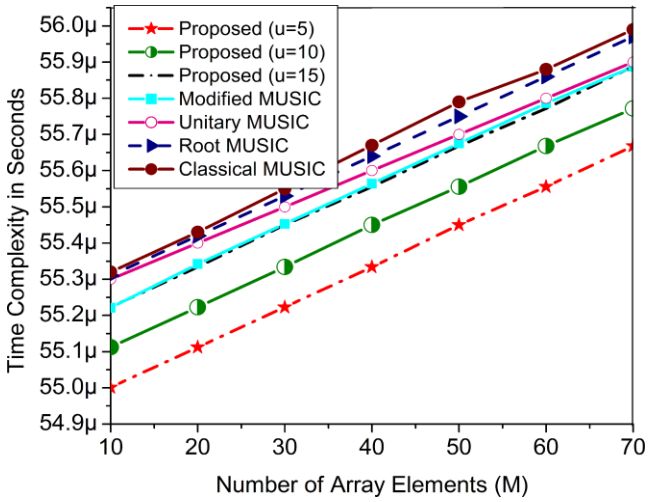

Figure 5: Complexity of computation versus number of array elements. (M =10, m = 2, K = 100, SNR = 20 dB, u=[5,10,15])

From figure 5 we observe that the proposed Nyström based MUSIC method is computationally efficient and simple.

4. Conclusion

A smart antenna for DOA estimation using low complexity method has been devised. The proposed modified MUSIC method provides the high resolution DOA estimation under low SNR condition for fewer snapshots. This makes communication system efficient and robust. The proposed Nyström based MUSIC method is computationally efficient and simple which requires only $O(Mm^2+Mm)$ flops to compute SVD of SCM which is very less as compared to existing methods. This makes it more suitable for practical array signal processing applications.

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