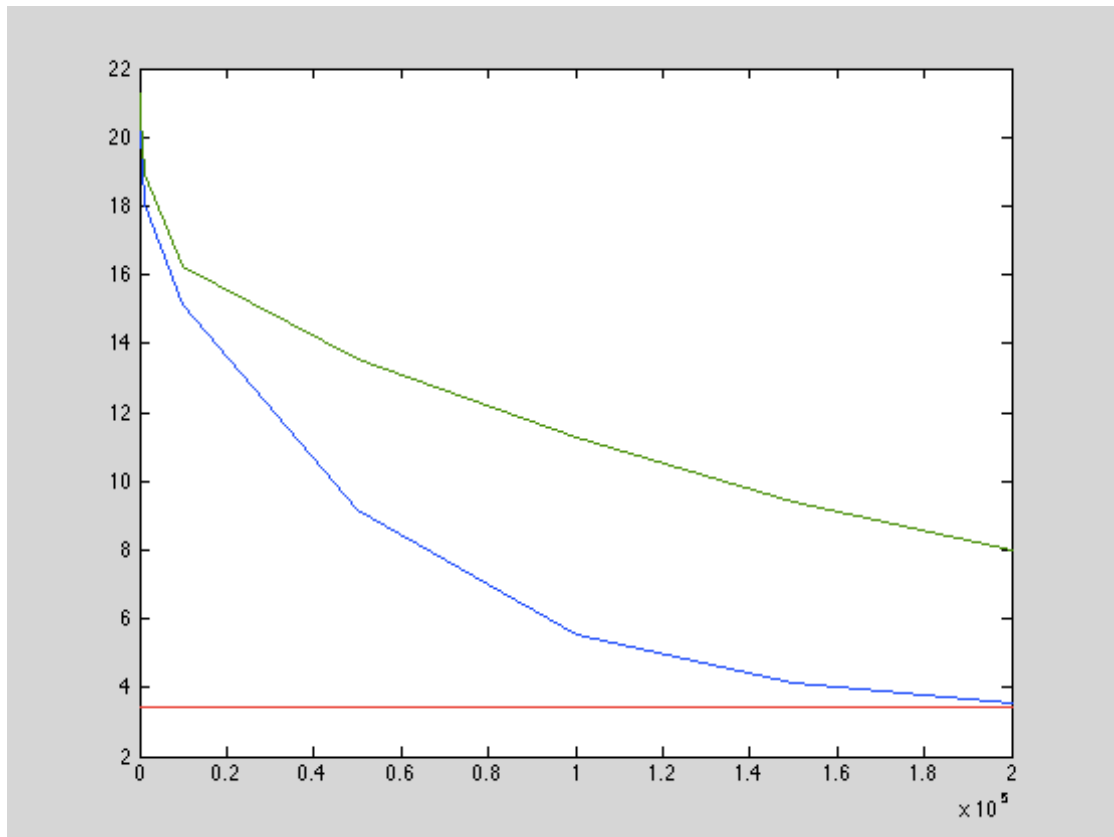


10601-HW4 REPORT

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- Did you receive any help whatsoever from anyone in solving this assignment? Yes / No. If you answered 'yes', give full details: No.
- Did you give any help whatsoever to anyone in solving this assignment? Yes / No. If you answered 'yes', give full details: No.



In this figure, X-axis is the number of rounds, Y-axis is test error.

The green line shows the performance of SD algorithm with increasing round.

The blue line shows the performance of LMS algorithm with increasing round.

The red line show the performance of Normal Equation.

Actually in this HW4, I choose $F(X)=a_1X^5+a_2X^4+a_3X^3+a_4X^2+a_5X+a_6$ as predicted function with vector $[1, x, x^2, x^3, x^4, x^5]$. And the minimum of error is 3.404. As the dimension is larger, it takes long time to converge to the global minimum which is 3.404 in this HW with LMS algorithm due to the inevitable large for-loop. So I set an appropriate

round for the LMS algorithm by my self. In addition, you can see from the figure that when round is $2 \cdot 10^5$, the error of SD line is still decreasing. Actually when I set the T of SD algorithm as 10^6 , it came out a error of 3.447. Therefore it is clear that SD algorithm converges faster than LMS algorithm.