CS5487 Programming Assignment 1

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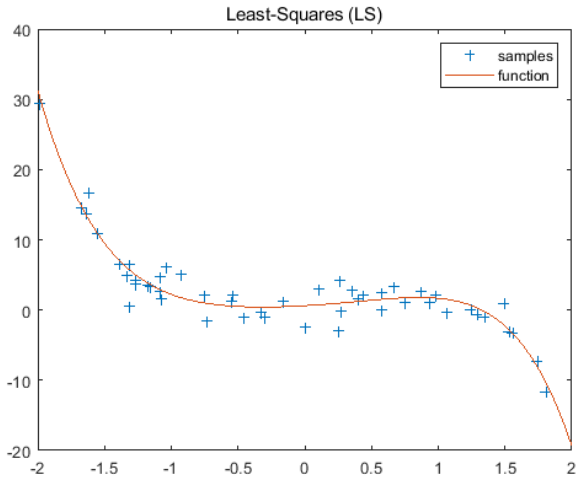
Polynomial Function

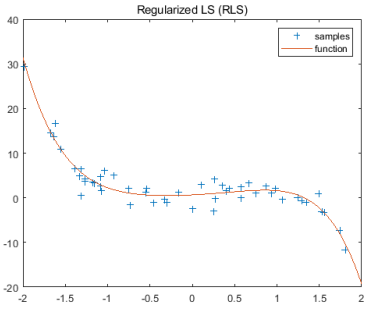
(a) Implement 5 regression algorithms

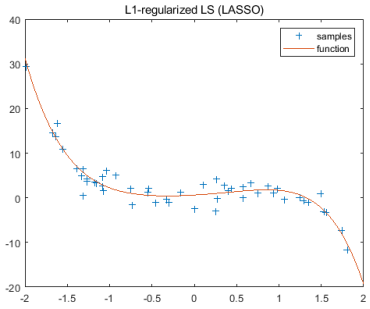
Source code can be found at `https://github.com/yangji12138/machine-learning/tree/master/Programming%201` or the Codes Appendix.

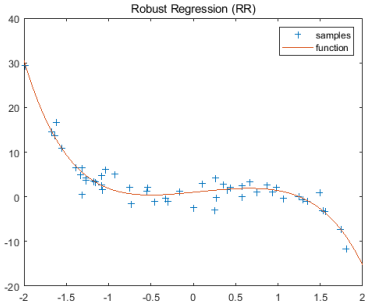
(b) Using Sample Data to estimate 5-th order poly function

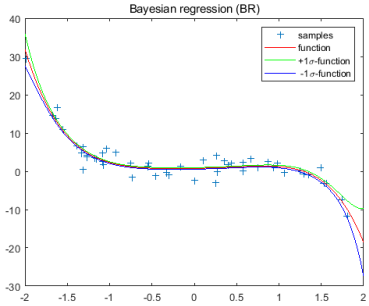
	Least-Sqaures (LS)	Regularized LS (RLS) $\lambda = 0.48$	L1-Regularized LS (LASSO) $\lambda = 0$
MSE	0.4086	0.4076	0.4086
	Robust Regression (RR)	Bayesian Regression (BR)	
MSE	0.7680	0.4592	











(c) Subset of Training Data

	Subset Ratio	Least-Sqaures (LS)	Regularized LS (RLS) $\lambda = 0.48$	L1-Regularized LS (LASSO) $\lambda = 0.5$
MSE	10%	28.312	82.205	27.046
	25%	10.793	3.475	1.138
	50%	12.857	0.284	0.95
	75%	0.332	0.941	0.563
		Robust Regression (RR)	Bayesian Regression (BR)	
MSE	10%	13069.7	31.689	
	25%	1.011	13.292	
	50%	3.95	0.307	
	75%	0.257	0.73	

Conclusion

Observe the experiment results, we can find that:

(i)

Codes

Source code can be found at `https://github.com/yangji12138/machine-learning/tree/master/Programming%201`.