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# Regression analysis and resampling methods

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# Abstract

[1]

## 1 Introduction

## 2 Theory

### 2.1 Standard

$$\beta = (\mathbf{X}^T \mathbf{X})^{-1} \mathbf{X}^T \mathbf{y}$$

### 2.2 Ridge

$$\beta = (\mathbf{X}^T \mathbf{X} + \lambda \mathbf{I})^{-1} \mathbf{X}^T \mathbf{y}$$

### 2.3 Lasso

$$\beta = \operatorname{argmin}_{\beta} \left\{ \sum_{i=1}^N \left( y_i - \beta_0 - \sum_{j=1}^p x_{ij} \beta_j \right)^2 + \lambda \sum_{j=1}^p |\beta_j|^q \right\}$$

### 2.4 k-fold and bootstrap

## 3 Method

## 4 Result & Discussion

## 5 Conclusion

## References

- [1] Morten Hjorth-Jensen. *Computational Physics*. Lecture notes. 2015. URL: <https://github.com/CompPhysics/ComputationalPhysics/blob/master/doc/Lectures/lectures2015.pdf>.

## 6 Appendix