PM 591 – Machine Learning for the Health Sciences.

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Conceptual

The goal of this exercise is to illustrate the grouping properties of Ridge and Elastic-net compared to Lasso Compute the full path for of solutions the Lasso, Ridge and elastic net on the data generated below using `glmnet` to generate a full path of solutions:

```
library(glmnet)
# Simulates Features
set.seed(520)

n = 50
x1 = rnorm(n)
x2 = x1
x3 = rnorm(n)
X = cbind(x1, x2, x3)

# Simulates error/noise
e = rnorm(n, sd = 0.1)

#Simulates outcome y
y = 1 + 2*x1 + e
```

```
lambda_grid = 10^seq(2,-2,length=n)
ridge = glmnet(X, y, family='gaussian', alpha=0, standardize=TRUE, lambda=lambda_grid)
ridge_coef = coef(ridge)
round(ridge_coef[, 42:50], 2)
```

```
## 4 x 9 sparse Matrix of class "dgCMatrix"
##               s41   s42   s43   s44   s45   s46   s47   s48  s49
## (Intercept)  0.99  0.99  0.99  0.99  0.99  0.99  0.99  0.99 0.99
## x1           0.99  0.99  0.99  1.00  1.00  1.00  1.00  1.00 1.00
## x2           0.97  0.97  0.97  0.97  0.97  0.98  0.98  0.98 0.98
## x3          -0.01 -0.01 -0.01 -0.01 -0.01 -0.01 -0.01 -0.01 0.00
```