Predicting Turbulence Simulations

Enzo Moraes Mescall, Martin Olarte, Charlotte Coudert

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```
data.train = read.csv("data-train.csv")
data.test = read.csv("data-test.csv")
```

Introduction

Methodology

We wanted a method to quickly perform cross validation on a candidate model and estimate its test MSE, so we created a general function with that purpose.

```
cv_mse = function(input_model, k = 5, iter = 25, data = clean) {
    sum_mse = 0
    for(i in 1:iter) {
      sum_mse = sum_mse + cv.glm(input_model, data = clean, K = k)$delta[1]
    }
    avg_mse = sum_mse/iter
    return(avg_mse)
}
```

After this, we created a function that would resemble our final product and take in a tuple of St, Re, and Fr and then return the four predicted moments. We reserved the global variable names `model_mX` for this final function.

```
# temp models
predictive_model = function(test_St, test_Re, test_Fr) {
  newdata = data.frame(list(St = test_St, Re = as.factor(test_Re), Fr = as.factor(test_Fr)))

  m1 = predict(model_m1, newdata =  newdata)
  m2 = predict(model_m2, newdata =  newdata)
  m3 = predict(model_m3, newdata =  newdata)
  m4 = predict(model_m4, newdata =  newdata)

  return(c(m1, m2, m3, m4))
}
```

Results

Conclusion