

TraitSimulation update

August 21, 2016

```
In [1]: include("../src/TraitSimulation.jl")
        using DataFrames, TraitSimulation
```

```
In [2]: df = convert(DataFrame, rand(10,6))
        names!(df, [:A, :B, :C, :D, :E, :F])
```

```
Out[2]: 10×6 DataFrames.DataFrame
 [U+2502] Row [U+2502] A          [U+2502] B          [U+2502] C          [U+2502]
 [U+251C] [U+2500] [U+2500] [U+2500] [U+2500] [U+2500] [U+253C] [U+2500] [U+2500] [U+2500]
 [U+2502] 1      [U+2502] 0.493326 [U+2502] 0.873984 [U+2502] 0.578156 [U+2502]
 [U+2502] 2      [U+2502] 0.402301 [U+2502] 0.566673 [U+2502] 0.687151 [U+2502]
 [U+2502] 3      [U+2502] 0.889905 [U+2502] 0.0964733 [U+2502] 0.623115 [U+2502]
 [U+2502] 4      [U+2502] 0.434791 [U+2502] 0.662799 [U+2502] 0.578401 [U+2502]
 [U+2502] 5      [U+2502] 0.861767 [U+2502] 0.190477 [U+2502] 0.482522 [U+2502]
 [U+2502] 6      [U+2502] 0.917524 [U+2502] 0.0908725 [U+2502] 0.601596 [U+2502]
 [U+2502] 7      [U+2502] 0.105202 [U+2502] 0.979812 [U+2502] 0.272234 [U+2502]
 [U+2502] 8      [U+2502] 0.56278 [U+2502] 0.351116 [U+2502] 0.110624 [U+2502]
 [U+2502] 9      [U+2502] 0.623879 [U+2502] 0.265178 [U+2502] 0.567449 [U+2502]
 [U+2502] 10     [U+2502] 0.385288 [U+2502] 0.5366 [U+2502] 0.193104 [U+2502]
```

```
In [3]: formula = T ~ A+2B*C+log(3D*(E+0.8F))+2.0
```

```
Out[3]: Formula: T ~ A + (2B) * C + log((3D) * (E + 0.8F)) + 2.0
```

```
In [4]: # simulate a normal response with  $\sigma=1.0$ 
        sim_model = Model(formula, IdentityLink(), NormalResponse(1.0))
        simulate(sim_model, df)
```

```
Out[4]: 10×1 DataFrames.DataFrame
 [U+2502] Row [U+2502] T          [U+2502]
 [U+251C] [U+2500] [U+2500] [U+2500] [U+2500] [U+2500] [U+253C] [U+2500] [U+2500] [U+2500]
 [U+2502] 1      [U+2502] 3.50451 [U+2502]
 [U+2502] 2      [U+2502] 4.31087 [U+2502]
 [U+2502] 3      [U+2502] 1.08767 [U+2502]
 [U+2502] 4      [U+2502] 2.39142 [U+2502]
 [U+2502] 5      [U+2502] 4.43254 [U+2502]
 [U+2502] 6      [U+2502] 2.89933 [U+2502]
 [U+2502] 7      [U+2502] 2.67302 [U+2502]
```

```
[U+2502] 8      [U+2502] 4.02146 [U+2502]
[U+2502] 9      [U+2502] 3.41931 [U+2502]
[U+2502] 10     [U+2502] 5.17638 [U+2502]
```

```
In [5]: # simulate a binomial response with n=100
sim_model = Model(formula, LogitLink(), BinomialResponse(100))
simulate(sim_model, df)
```

```
Out [5]: 10x1 DataFrames.DataFrame
[U+2502] Row [U+2502] T      [U+2502]
[U+251C] [U+2500] [U+2500] [U+2500] [U+2500] [U+2500] [U+253C] [U+2500] [U+2500] [U+
[U+2502] 1      [U+2502] 93      [U+2502]
[U+2502] 2      [U+2502] 99      [U+2502]
[U+2502] 3      [U+2502] 49      [U+2502]
[U+2502] 4      [U+2502] 91      [U+2502]
[U+2502] 5      [U+2502] 100     [U+2502]
[U+2502] 6      [U+2502] 99      [U+2502]
[U+2502] 7      [U+2502] 88      [U+2502]
[U+2502] 8      [U+2502] 97      [U+2502]
[U+2502] 9      [U+2502] 98      [U+2502]
[U+2502] 10     [U+2502] 96      [U+2502]
```

```
In [6]: # simulate a Poisson response
sim_model = Model(formula, LogLink(), PoissonResponse())
simulate(sim_model, df)
```

```
Out [6]: 10x1 DataFrames.DataFrame
[U+2502] Row [U+2502] T      [U+2502]
[U+251C] [U+2500] [U+2500] [U+2500] [U+2500] [U+2500] [U+253C] [U+2500] [U+2500] [U+
[U+2502] 1      [U+2502] 12      [U+2502]
[U+2502] 2      [U+2502] 99      [U+2502]
[U+2502] 3      [U+2502] 1       [U+2502]
[U+2502] 4      [U+2502] 17      [U+2502]
[U+2502] 5      [U+2502] 99      [U+2502]
[U+2502] 6      [U+2502] 77      [U+2502]
[U+2502] 7      [U+2502] 10      [U+2502]
[U+2502] 8      [U+2502] 37      [U+2502]
[U+2502] 9      [U+2502] 32      [U+2502]
[U+2502] 10     [U+2502] 33      [U+2502]
```

```
In [7]: # simulate a Bernoulli response
sim_model = Model(formula, LogitLink(), BernoulliResponse())
simulate(sim_model, df)
```

```
Out [7]: 10x1 DataFrames.DataFrame
[U+2502] Row [U+2502] T      [U+2502]
[U+251C] [U+2500] [U+2500] [U+2500] [U+2500] [U+2500] [U+253C] [U+2500] [U+2500] [U+
[U+2502] 1      [U+2502] 1       [U+2502]
[U+2502] 2      [U+2502] 1       [U+2502]
```

```
[U+2502] 3      [U+2502] 0 [U+2502]
[U+2502] 4      [U+2502] 1 [U+2502]
[U+2502] 5      [U+2502] 1 [U+2502]
[U+2502] 6      [U+2502] 1 [U+2502]
[U+2502] 7      [U+2502] 1 [U+2502]
[U+2502] 8      [U+2502] 1 [U+2502]
[U+2502] 9      [U+2502] 1 [U+2502]
[U+2502] 10     [U+2502] 1 [U+2502]
```

```
In [8]: # simulate an Exponential response
sim_model = Model(formula, InverseLink(), ExponentialResponse())
simulate(sim_model, df)
```

```
Out[8]: 10x1 DataFrames.DataFrame
[U+2502] Row [U+2502] T          [U+2502]
[U+251C] [U+2500] [U+2500] [U+2500] [U+2500] [U+2500] [U+253C] [U+2500] [U+2500] [U+
[U+2502] 1      [U+2502] 0.0237553 [U+2502]
[U+2502] 2      [U+2502] 0.140551  [U+2502]
[U+2502] 3      [U+2502] 8.87671   [U+2502]
[U+2502] 4      [U+2502] 0.346847  [U+2502]
[U+2502] 5      [U+2502] 0.351104  [U+2502]
[U+2502] 6      [U+2502] 0.308562  [U+2502]
[U+2502] 7      [U+2502] 0.0837352 [U+2502]
[U+2502] 8      [U+2502] 0.253411  [U+2502]
[U+2502] 9      [U+2502] 0.452532  [U+2502]
[U+2502] 10     [U+2502] 0.0268883 [U+2502]
```

```
In [11]: # simulate a gamma response with shape parameter 2.0
sim_model = Model(formula, InverseLink(), GammaResponse(2.0))
simulate(sim_model, df)
```

```
Out[11]: 10x1 DataFrames.DataFrame
[U+2502] Row [U+2502] T          [U+2502]
[U+251C] [U+2500] [U+2500] [U+2500] [U+2500] [U+2500] [U+253C] [U+2500] [U+2500] [U+
[U+2502] 1      [U+2502] 0.344344 [U+2502]
[U+2502] 2      [U+2502] 0.289098 [U+2502]
[U+2502] 3      [U+2502] 14.8307  [U+2502]
[U+2502] 4      [U+2502] 0.932325 [U+2502]
[U+2502] 5      [U+2502] 0.651633 [U+2502]
[U+2502] 6      [U+2502] 0.460887 [U+2502]
[U+2502] 7      [U+2502] 1.24464  [U+2502]
[U+2502] 8      [U+2502] 1.57885  [U+2502]
[U+2502] 9      [U+2502] 0.196791 [U+2502]
[U+2502] 10     [U+2502] 0.131243 [U+2502]
```

```
In [ ]:
```