

R/mosaic Calculus Commands

Preliminaries

Load the mosaic package.

```
require(mosaic)
```

Define a math function

```
f = makeFun(a * x^2 ~ x)
g = makeFun(sin(y * x) ~ x & y)
```

Generate random function

```
h = rfun(~x&y, seed=6732)
```

Read data file

```
utils = fetchData("utilities.csv")
```

Fit a model

```
m=fitModel(ccf ~ A+B*temp, data=utils)
coef(m)
```

Smoothers & splines

```
s1 = smoother(ccf ~ temp, data=utils)
s2 = spliner(ccf ~ temp, data=utils)
```

Differentiation

```
df = D(f(x) ~ x)
dgxy = D(g(x=x,y=y) ~ x & y)
```

Anti-differentiation / Integration

```
F = antiD(f(x,a=2) ~ x)
F(3)-F(1)
```

Solve equations / find zeros.

```
findZeros(sin(x^2) - 0.5 ~ x,
          x.lim=c(0,5))
```

Solve Differential Equations

```
s = integrateODE(dx ~ r*x*(K - x),
                 x=1.3,
                 r=.1, K=3, tdur=10)
s$x(3) # eval x at time 3
```

Linear algebra

```
b = c(5,2,1)
v1 = c(3,7,2)
v2 = c(2,0,1)
project(b ~ v1 + v2)
```