

# R's data.table Package

I recently discovered the `data.table` package and found it useful for DET manipulation. Suppose I have a `data.table` in this format:

```
head(dets, 4)
```

```
##      matcher      t      FMR      FNMR
## 1:      sift      Inf 1.0000000 0.0000000000
## 2:      sift 0.0476190 0.9959494 0.0000000000
## 3:      sift 0.0416667 0.9918987 0.0000000000
## 4:      sift 0.0370370 0.9883544 0.0005063291
```

Then executing

```
dets[, .SD[(FMR=10^(4:5)), !"t", on="FMR", roll=-Inf], by=matcher]
```

```
##      matcher  FMR      FNMR
## 1:      sift 1e-04 0.2192405
## 2:      sift 1e-05 0.2192405
## 3:      stub 1e-04 0.9524051
## 4:      stub 1e-05 0.9524051
```

returns the desired FNMR for each matcher at each of the requested FMRs.

The `roll=-Inf` ensures that the interpolation between DET points is performed correctly. Formally,

$$\text{FNMR}(\text{FMR}_0) = \min_{\forall t} \{ \text{FNMR}(t) : \text{FMR}(t) \geq \text{FMR}_0 \}$$

where  $t$  is the decision threshold and  $\text{FMR}_0$  is the targeted false match rate.

This concludes my demonstration of using R markdown with integrated R and  $\text{\LaTeX}$ .