



FINANCIAL TRADING IN R

Introduction to Signals

What Are Signals?

- Signals are the interactions of:
 - Market data with indicators
 - Indicators with other indicators
- Examples:
 - 50-day MA crossing over 200-day MA
 - oscillator crosses under 20
- Signal is necessary (but not sufficient) for buy/sell order

Using `add.signal()`

- Very similar to the process for creating indicators
- Only a few signal functions

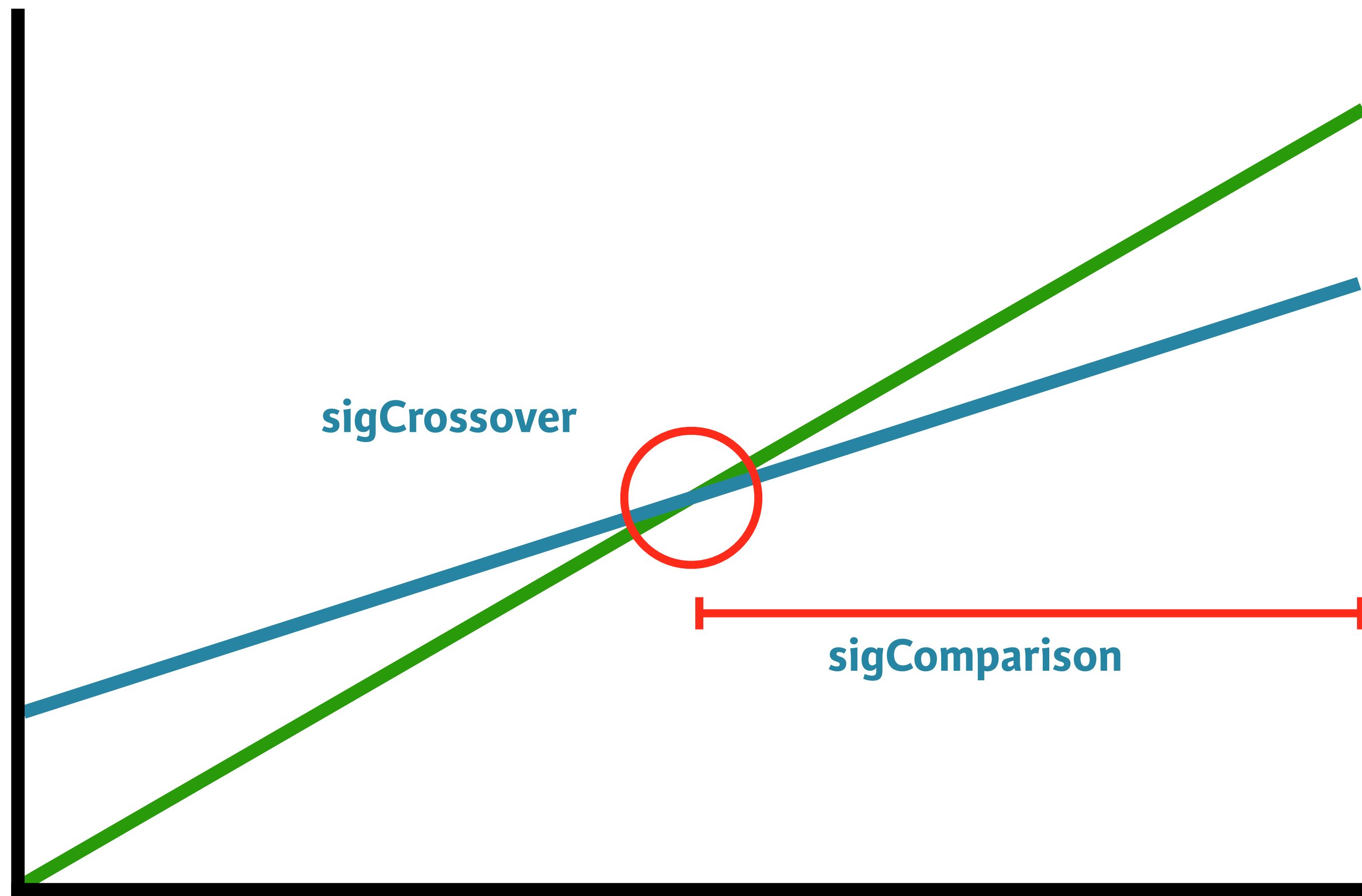
```
> add.signal(strategy.st,  
             name = "function",  
             arguments = list(arguments),  
             label = "label")
```

- Again, similar to `apply` family

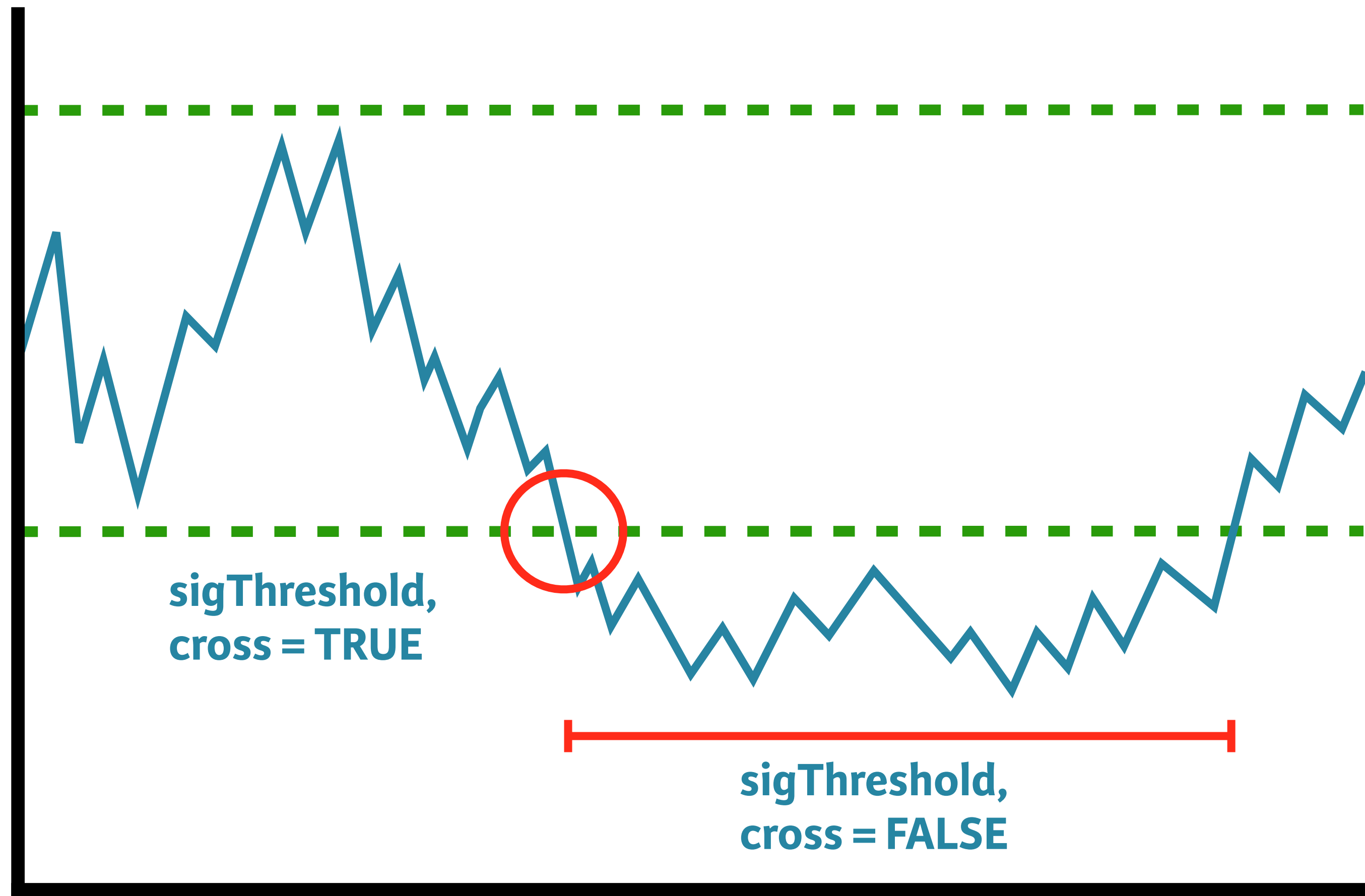
Four Types of Signals

- **sigComparison:** Relationship between two indicators, returns 1 if relationship is true
- **sigCrossover:** Similar to sigComparison, returns 1 on the first occurrence
- **sigThreshold:** Compares range-bound indicator to a static quantity
- **sigFormula:** Flexible signal function

Examples



Examples





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sigComparison and sigCrossover

Trend indicators

- sigCrossover and sigComparison
- Both compare two variable quantities
- Example:
 - shorter lookback MA crosses over longer lookback MA (50-day SMA versus 200-day SMA)

Structure

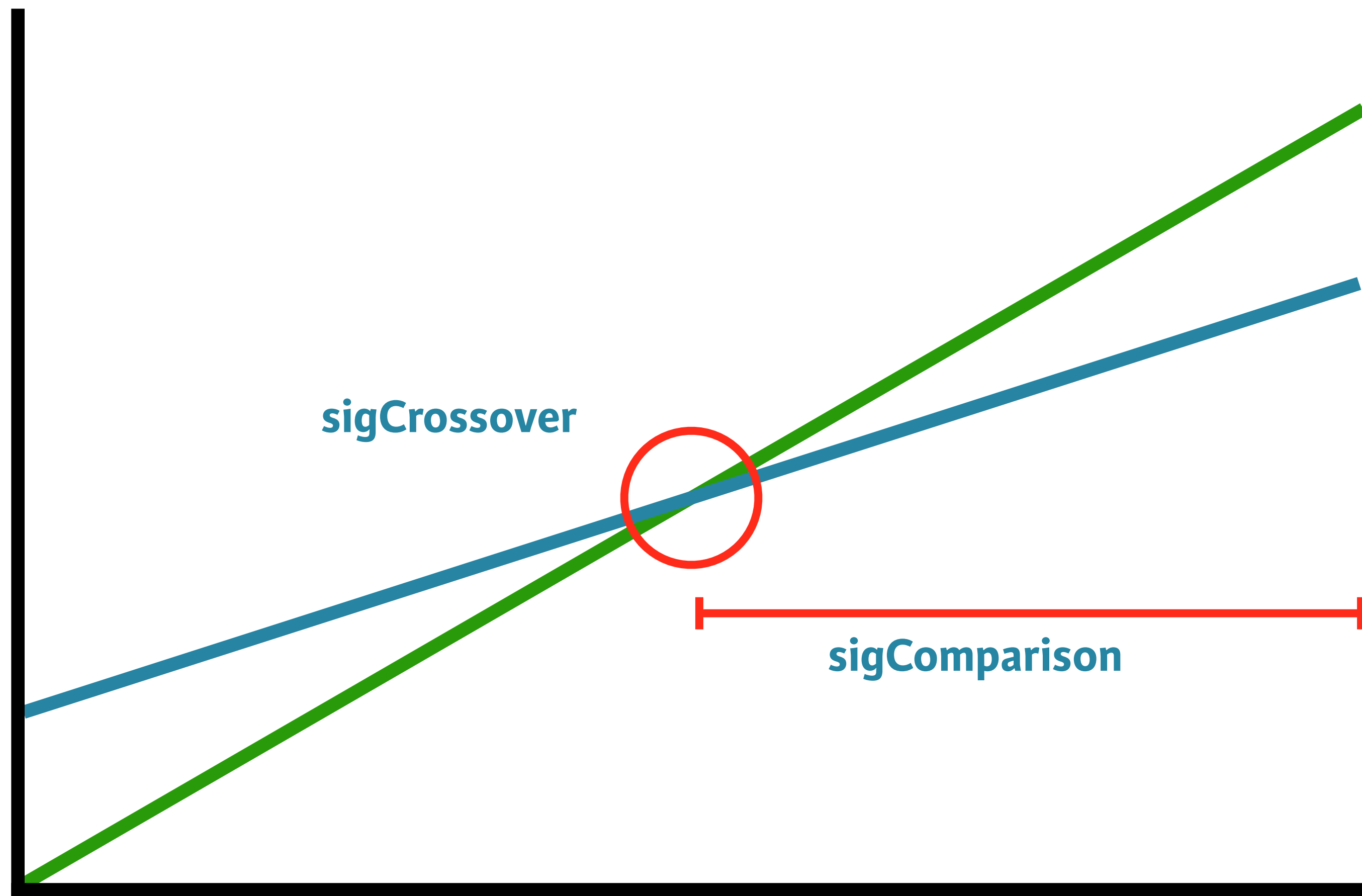
```
> add.signal(strategy.st,  
  name = "sigComparison",  
  arguments = list(columns = c("str1", "str2"),  
                    relationship = "lt" ),  
  label = "siglabel")  
  
> add.signal(strategy.st,  
  name = "sigCrossover",  
  arguments = list(columns = c( "str1", "str2"),  
                    relationship = "eq"),  
  label = "siglabel")
```

- “gt”, “lt”, “eq”, “lte”, “gte”

Structure

```
> add.signal(strategy.st,  
  name = "sigCrossover",  
  arguments = list(columns = c("SMA50", "SMA200"),  
                    relationship = "gt"),  
  label = "longfilter")  
  
> add.signal(strategy.st,  
  name = "sigComparison",  
  arguments = list(columns = c("SMA50", "SMA200",  
                              relationship = "lt" ),  
  label = "filterexit")
```

Examples





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sigTreshold

About sigTreshold

- deals with bounded indicators interacting with critical (and usually fixed) values
- Examples:
 - when the DVO crosses under 20
 - on indicator with running probability value (between 0 and 1)
 - on rolling ratio's that center on 0.

Structure

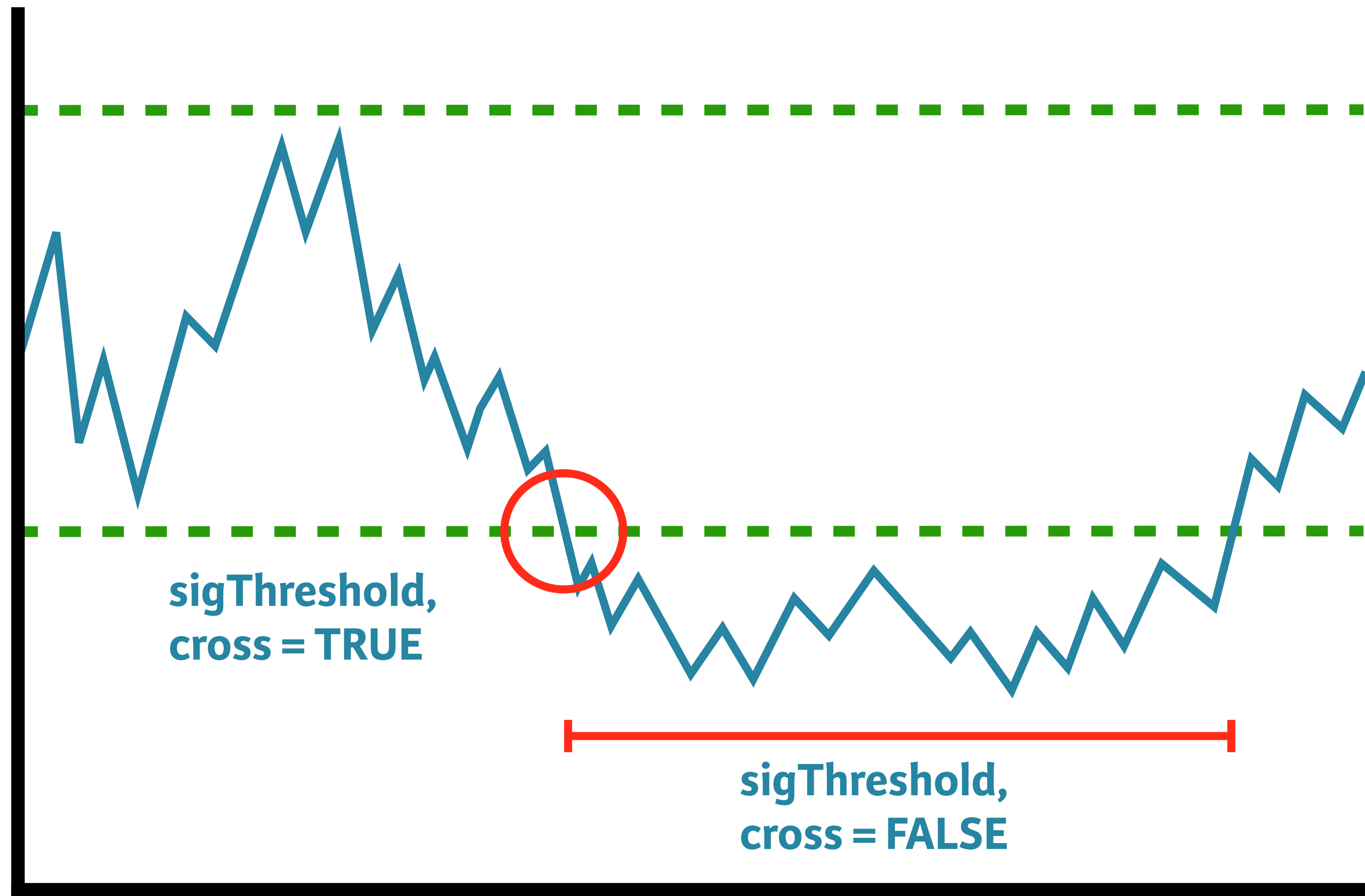
```
> add.signal(strategy.st,  
  name = "sigTreshold",  
  arguments = list(column = "str1",  
                    threshold = 20,  
                    cross = TRUE,  
                    relationship = "lt" ),  
  label = "siglabel")
```

- `cross = TRUE` mimics `sigCrossover`
- `cross = FALSE` mimics `sigComparison`

Examples

```
> add.signal(strategy.st,  
  name = "sigThreshold",  
  arguments = list(column = "DVO_2_126",  
    threshold = 20,  
    cross = FALSE,  
    relationship = "lt"),  
  label = "thresholdfilter")  
  
> add.signal(strategy.st,  
  name = "sigThreshold",  
  arguments = list(column = "DVO_2_126",  
    threshold = 80,  
    cross = TRUE,  
    relationship = "gt"),  
  label = "thresholdfilter")
```

Examples





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sigFormula

About sigFormula

- Catch-all signal allowing for combinations of signals
- Uses string evaluation
- Example:
 - ONLY act upon oscillator signaling IF favorable market environment (50-day SMA above 200-day SMA)
 - make sure to buy a temporary pullback, not a large decline

Structure

```
> add.signal(strategy.st,  
  name = "sigFormula",  
  arguments = list(formula = "regular logical statement  
                        inside an if statement",  
                    cross = TRUE),  
  label = "yourlabel")
```

- Base R: if(statement 1 and statement 2)

```
> add.signal(strategy.st,  
  name = "sigFormula",  
  arguments = list(formula = "statement1 & statement2",  
                    cross = TRUE),  
  label = "yourlabel")
```

Example

```
> add.signal(strategy.st,  
  name = "sigFormula",  
  arguments = list(formula = "longthreshold & longfilter",  
                    cross = TRUE),  
  label = "longentry")
```

- make sure that the columns in the logical statement are in the strategy prior to the sigFormula signal call



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