Package: trackopt (via r-universe)

October 20, 2026

Type Package

Title Track Numerical Optimization

Version 0.1.1

Description Tracks parameter values, gradients, and Hessians at each iteration of numerical optimizers. Useful for analyzing optimization progress, diagnosing issues, and studying convergence behavior.

License GPL (>= 3)

Encoding UTF-8

RoxygenNote 7.3.3

Roxygen list(markdown = TRUE)

Imports checkmate, cli, ggplot2, oeli (>= 0.7.2), optimizeR (>= 1.2.0), stats, tibble, utils

Suggests testthat (>= 3.0.0)

Depends R (>= 4.1.0)

Config/testthat/edition 3

URL https://github.com/loelschlaeger/trackopt

BugReports https://github.com/loelschlaeger/trackopt/issues

Config/pak/sysreqs cmake make libicu-dev libuv1-dev libssl-dev

Repository https://loelschlaeger.r-universe.dev

Date/Publication 2026-05-12 15:53:09 UTC

RemoteUrl https://github.com/loelschlaeger/trackopt

RemoteRef HEAD

RemoteSha adce0705e3bb14448e6f329a2b607fe06dce12bd

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nlm_track *Track numerical optimization*

Description

- `nlm_track()`: track `nlm` iterations
- `optim_track()`: track `optim` iterations
- `summary()`: summarize an optimization track
- `autoplot()`: visualize a track with one or two parameters

Usage

```
nlm_track(
  f,
  p,
  target = NULL,
  npar = NULL,
  gradient = NULL,
  hessian = NULL,
  ...,
  iterations_max = 100,
  tolerance = 1e-06,
  typsize = rep(1, length(p)),
  fscale = 1,
  ndigit = 12,
  stepmax = max(1000 * sqrt(sum((p/typsize)^2)), 1000),
  steptol = 1e-06,
  minimize = TRUE,
  verbose = FALSE
)

optim_track(
  f,
  p,
  target = NULL,
  npar = NULL,
  gradient = NULL,
  ...,
  iterations_max = 100,
  tolerance = 1e-06,
  lower = NULL,
  upper = NULL,
  method = c("Nelder-Mead", "BFGS", "CG", "L-BFGS-B", "SANN", "Brent"),
  control = list(),
  minimize = TRUE,
  verbose = FALSE
```

```
)

## S3 method for class 'trackopt'
summary(object, ...)

## S3 method for class 'trackopt'
autoplot(object, iteration = NULL, xlim = NULL, xlim2 = NULL, ...)
```

Arguments

f	[function] A function to optimize. It must return a single numeric value. By default, the first argument of f is optimized. That argument should be a numeric vector of the same length as p. Additional arguments can be supplied through .... Use target when f should be optimized over another argument or over multiple arguments.
p	[numeric()] The starting parameter values for the target argument(s).
target	[character() | NULL] The names of the numeric argument(s) to optimize. If NULL (default), the first argument of f is used.
npar	[integer()] The length of each target argument. Specify npar when optimizing over multiple target arguments so p can be split correctly. If target contains a single argument and npar is NULL, length(p) is used.
gradient	[function | NULL] Optionally a function that returns the gradient of f. Its arguments must match the arguments of f.
hessian	[function | NULL] Optionally a function that returns the Hessian of f. Its arguments must match the arguments of f.
...	Additional arguments passed to f, and to gradient and hessian when they are specified.
iterations_max	[integer(1)] The maximum number of tracked optimization steps before termination.
tolerance	[numeric(1)] Tracking stops when the absolute change in function value between two consecutive iterations is less than this value.
typsize, fscale, ndigit, stepmax, steptol	Arguments passed on to nlm.
minimize	[logical(1)] If TRUE, minimize f; otherwise maximize it.

verbose [logical(1)]
If TRUE, print progress after each iteration.

lower, upper [numeric() | NULL]
Optional lower and upper parameter bounds. Scalars are recycled to the number of parameters.

method, control Arguments passed on to optim.
Elements trace and maxit are ignored in control because optim_track() controls tracing and iteration limits directly.

object [trackopt]
A trackopt object.

iteration [integer(1)]
The iteration to plot.
If NULL, the last iteration is plotted.
This option is useful for creating animations with the R Markdown animation chunk option.

xlim, xlim2 [numeric(2)]
Ranges for the first and second parameter to plot.
If NULL, they are derived from the parameter ranges in object.

Value

A tibble with one row per stored iteration, including the starting point.

Examples

```
himmelblau <- function(x) {
  (x[1]^2 + x[2] - 11)^2 + (x[1] + x[2]^2 - 7)^2
}
track <- nlm_track(f = himmelblau, p = c(0, 0))
summary(track)
ggplot2::autoplot(track)
```

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