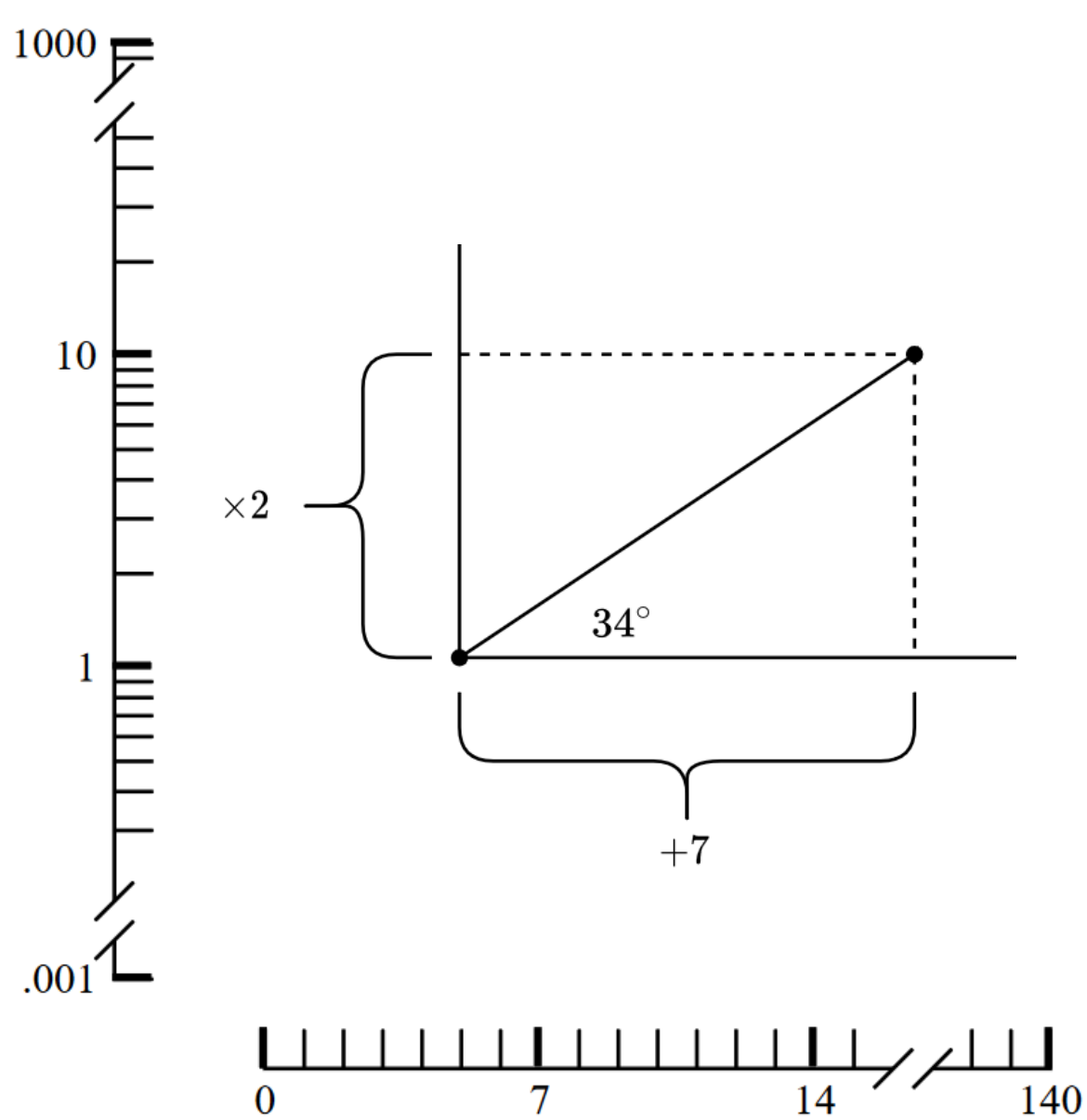


ptchart : An R package for computing Precision Teaching measures and charts

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Introduction

- Precision Teaching is a domain within Applied Behavior Analysis interested in measuring and charting behavior on a standardized chart called Standard Celeration Chart (Heron, Heward & Cooper, 2014).
- The Standard Celeration Chart is used to assess the effectiveness of an intervention and, when needed, to make appropriate changes.
- Calculations and chartings are traditionally made on paper with pencil and a frequency finder.
- The paper-pencil approach is suitable for applied purposes but not for more rigorous, scientific ones.
- Very few digital tools exist and most are designed for clinic purposes, but there is no existing software tool designed for research in the Precision Teaching field.



Standard Celeration Chart

The Standard Celeration Chart is characterized by three key elements:

- a linear x-scale that represents continuous days,
- a logarithmic y-scale that represents frequencies (count divided minute),
- a fixed 34° angle which represent a doubling by week.

Step 1. Dataset

Example of dataset provided with the package.

Library(ptchart)

```
my_data <- example_pt_data
```

date	day	count	time	phase
<date>	<int>	<dbl>	<dbl>	<chr>
2021-07-19	1	4	1	A
2021-07-20	2	5	1	A
2021-07-21	3	4	1	A
2021-07-22	4	6	1	A
2021-07-23	5	5	1	A
2021-07-26	8	7	1	A
2021-07-27	9	7	1	A
2021-07-28	10	6	1	A
2021-07-29	11	8	1	A
2021-07-30	12	8	1	A
2021-08-02	15	17	1	B
2021-08-03	16	17	1	B
2021-08-04	17	14	1	B
2021-08-05	18	16	1	B
2021-08-06	19	13	1	B
2021-08-09	22	10	1	B
2021-08-10	23	9	1	B
2021-08-11	24	7	1	B
2021-08-12	25	8	1	B
2021-08-13	26	6	1	B

Step 2. Calculations

Main function that returns a S3 object of class `ptstat`.

```
results <- ptstat(my_data,
  day = "day", count = "count",
  time = "time", phase = "phase")
```

Step 3.1 Extracting measures

Extract specific precision teaching results with extractor functions

```
celeration(results)
  phase c_raw      c c_raw_err c_err
  <chr> <dbl> <dbl> <dbl> <dbl>
1 A     1.50    1.50    0.542  1.85
2 B     0.518   1.93    1.21   1.21
```

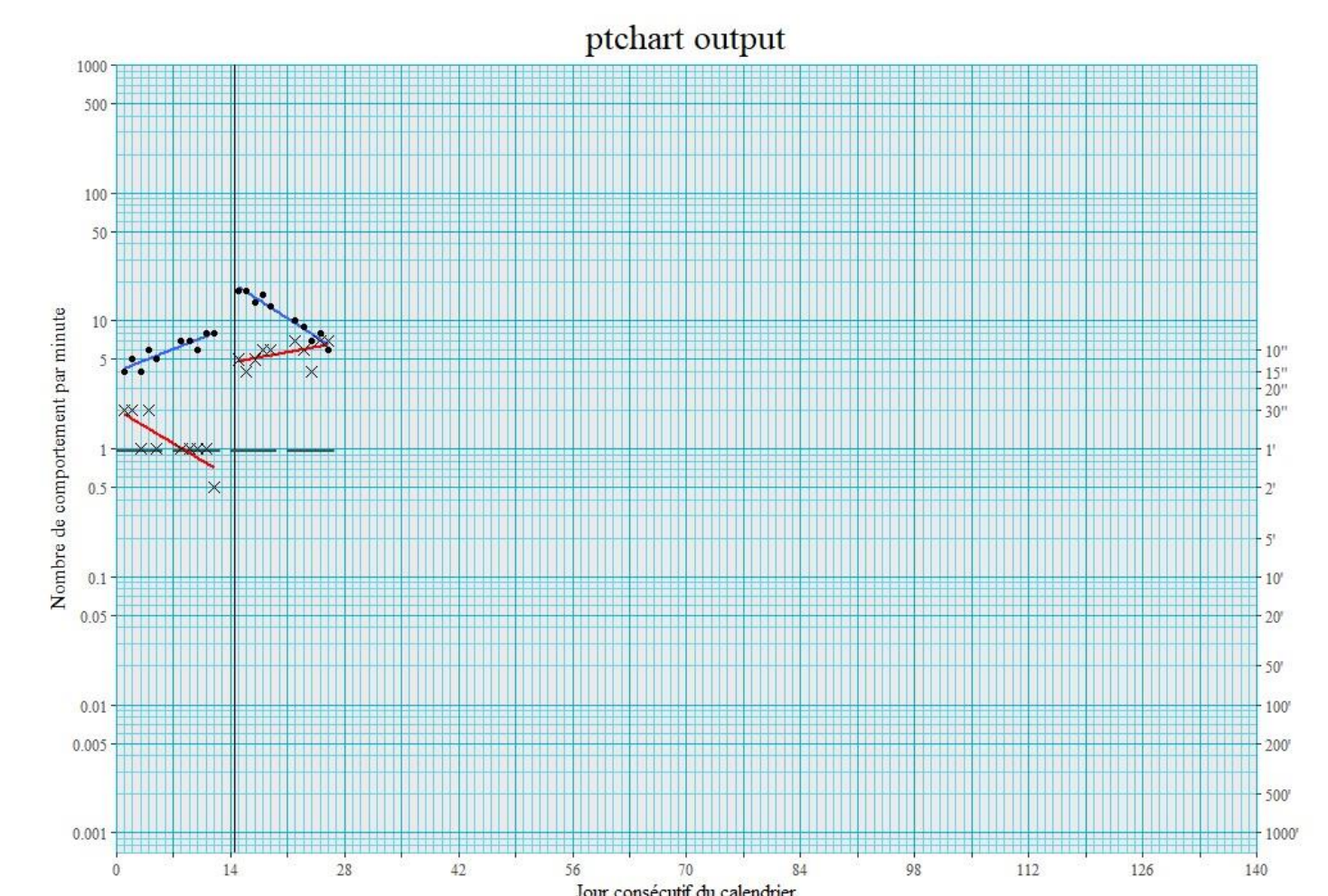
```
jump(results)
  from to   j_raw   j
  <chr> <chr> <dbl> <dbl>
1 A    B     2.30   2.30
```

```
turn(results)
  from to   t_raw   t
  <chr> <chr> <dbl> <dbl>
1 A    B     0.346  2.89
```

Also: bounce(), bounce_up(), bounce_down(), bounce_total(), accuracy().

Step 3.2 Chart

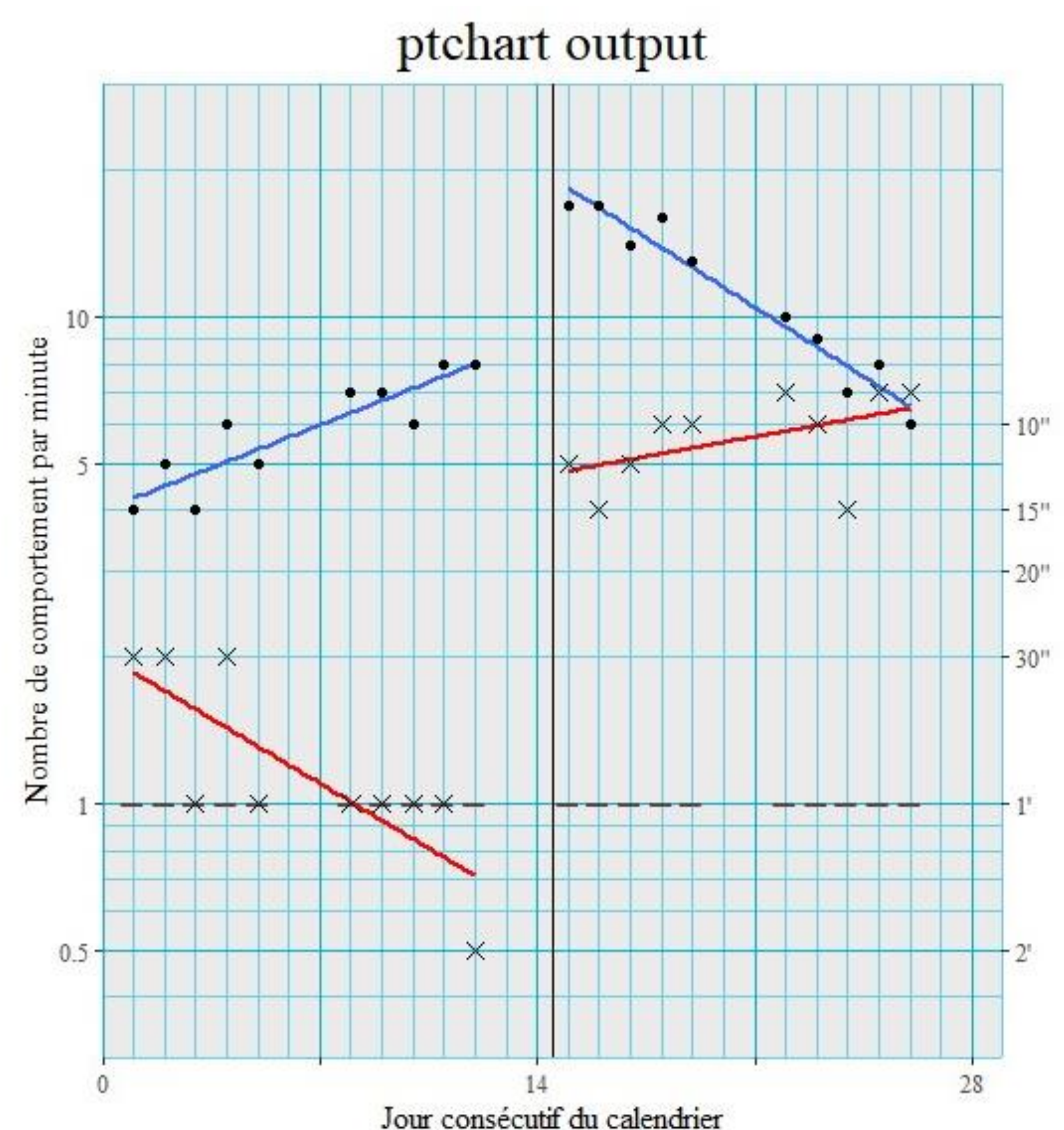
Generate a computerized chart based on the Standard Celeration Chart with S3 object of class `ptstat`. Based on the ggplot2 package.



```
ptchart(results)
```

Arguments allow to output a certain portion of the chart while keeping its standard angle of 34°.

```
ptchart(results,
  zoom_x = as.Date(c("2021-07-18", "2021-08-16")),
  zoom_y = c(0.3, 30))
```



Limitations and future developments

- Times × and division ÷ symbols, traditionally used, are not printed, but specified with "raw" measure vs "non-raw".
- All calculations are done at the same time.
- Soon available at `remotes::install_github(repo = "agkamel/ptchart")`