fitDTVARMx: Internal Tests

Ivan Jacob Agaloos Pesigan

Tests

```
#> test-psi-diag
#> Running DTVAR with 12 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 12 parameters
#>
#>  Lowest minimum so far:   1526.00731414896
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1526.0073 (started at 5699.0002)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.68189327158947 4,0.505053241223708,0.00510866892363984,-0.00880534052876268,0.602624649024426,0
#> Running DTVAR with 12 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 12 parameters
#>
#>  Lowest minimum so far:   1683.45326767594
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1683.4533 (started at 5881.5124)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.71480467820456,0.446703808115241,-0.137212069780235,-0.00286224472857526,0.597355831530442,0.5
#> Running DTVAR with 12 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 12 parameters
```

```
#>
#>  Lowest minimum so far:   1605.51702315237
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1605.517 (started at 6215.4721)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.71807819288672,0.528392528302594,-0.104829115204023,0.00732750699824601,0.574300325081348,0.49
#> Running DTVAR with 12 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 12 parameters
#>
#>  Lowest minimum so far:   1540.5851271712
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1540.5851 (started at 6304.8811)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.704947412341599,0.554348582548788,-0.087319066519666 4,0.0246870702290564,0.59942291603357,0.40
#> Running DTVAR with 12 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 12 parameters
#>
#>  Lowest minimum so far:   1544.69539781234
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1544.6954 (started at 5426.6766)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.688878981232639,0.416188669542742,-0.20580061653624,-0.00462533218292364,0.686315213100752,0.4
#>
#> Means of the estimated paramaters per individual.
#>      beta_11      beta_21      beta_31      beta_12      beta_22      beta_32
#>  0.701720507  0.490137366 -0.106010440  0.003144332  0.612003787  0.435809022
#>      beta_13      beta_23      beta_33       psi_11       psi_22       psi_33
#> -0.014208231  0.006029603  0.476983836  0.099522285  0.099143080  0.098132339
#>
```

```
#> Estimated paramaters per individual.
#>        beta_11   beta_21      beta_31      beta_12   beta_22   beta_32
#> [1,] 0.6818933 0.5050532  0.005108669 -0.008805341 0.6026246 0.3434339
#> [2,] 0.7148047 0.4467038 -0.137212070 -0.002862245 0.5973558 0.5128712
#> [3,] 0.7180782 0.5283925 -0.104829115  0.007327507 0.5743003 0.4944582
#> [4,] 0.7049474 0.5543486 -0.087319067  0.024687070 0.5994229 0.4090176
#> [5,] 0.6888790 0.4161887 -0.205800617 -0.004625332 0.6863152 0.4192641
#>           beta_13     beta_23   beta_33     psi_11     psi_22     psi_33
#> [1,]  0.028747443  0.05647696 0.5183946 0.09611174 0.09990712 0.09533265
#> [2,] -0.024206171 -0.00479118 0.4822680 0.10395017 0.10226569 0.10002056
#> [3,]  0.007524542  0.03085868 0.4148173 0.09818538 0.10348889 0.09775023
#> [4,] -0.047063127 -0.02958436 0.4986395 0.10377264 0.08978277 0.09991550
#> [5,] -0.036043841 -0.02281209 0.4707998 0.09559150 0.10027094 0.09764276
#> Test passed
```

```
#> test-psi-full
#> Running DTVAR with 15 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 15 parameters
#>
#>  Lowest minimum so far:   1524.97939232159
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1524.9794 (started at 5699.0002)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.681884439456414,0.505025112104999,0.00506051838664129,-0.0088084074311384,0.602653227193641,0
#> Running DTVAR with 15 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 15 parameters
#>
#>  Lowest minimum so far:   1681.83659549413
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1681.8366 (started at 5881.5124)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.714644509674087,0.446353640025954,-0.137212330708725,-0.00257768066872478,0.597640239933588,0.5
#> Running DTVAR with 15 parameters
```

```
#>
#> Beginning initial fit attempt
#> Running DTVAR with 15 parameters
#>
#>  Lowest minimum so far:   1601.71644591382
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1601.7164 (started at 6215.4721)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.718004772540333,0.528419892670838,-0.104829427159213,0.00736363262322431,0.574273821918315,0.49
#> Running DTVAR with 15 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 15 parameters
#>
#>  Lowest minimum so far:   1531.86993218526
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1531.8699 (started at 6304.8811)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.70497461724632,0.554273482827876,-0.0872848784429463,0.0247249514112392,0.599417568326345,0.408
#> Running DTVAR with 15 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 15 parameters
#>
#>  Lowest minimum so far:   1543.7523526894
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1543.7524 (started at 5426.6766)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.688872850466814,0.416165219593816,-0.20578680633397,-0.00462437281075547,0.686325527137826,0.41

#>
#> Means of the estimated paramaters per individual.
#>       beta_11       beta_21       beta_31       beta_12       beta_22
```

```
#>  0.7016762379  0.4900474694 -0.1060105849  0.0032156246  0.6120620769
#>       beta_32       beta_13       beta_23       beta_33        psi_11
#>  0.4357928929 -0.0142610501  0.0060008367  0.4769960202  0.0995165985
#>        psi_21        psi_22        psi_31        psi_32        psi_33
#>  0.0003752419  0.0991479335  0.0006857310  0.0001355823  0.0981329821
#>
#> Estimated paramaters per individual.
#>        beta_11   beta_21      beta_31      beta_12   beta_22   beta_32
#> [1,] 0.6818844 0.5050251  0.005060518 -0.008808407 0.6026532 0.3434700
#> [2,] 0.7146445 0.4463536 -0.137212331 -0.002577681 0.5976402 0.5129555
#> [3,] 0.7180048 0.5284199 -0.104829427  0.007363633 0.5742738 0.4944551
#> [4,] 0.7049746 0.5542735 -0.087284878  0.024724951 0.5994176 0.4088297
#> [5,] 0.6888729 0.4161652 -0.205786806 -0.004624373 0.6863255 0.4192542
#>           beta_13      beta_23   beta_33     psi_11        psi_21     psi_22
#> [1,]  0.028766345  0.056455488 0.5183971 0.09611165  0.0016516289 0.09990869
#> [2,] -0.024434495 -0.005013752 0.4821948 0.10392616 -0.0005052964 0.10229595
#> [3,]  0.007565448  0.030893078 0.4147986 0.09818614 -0.0056369981 0.10348547
#> [4,] -0.047154963 -0.029503896 0.4987864 0.10376766  0.0050355456 0.08977813
#> [5,] -0.036047586 -0.022826735 0.4708033 0.09559138  0.0013313293 0.10027143
#>             psi_31       psi_32     psi_33
#> [1,] -7.865550e-04  0.002525396 0.09533547
#> [2,] -2.856547e-03 -0.002869891 0.10001678
#> [3,]  2.347784e-05  0.002602342 0.09774675
#> [4,]  6.226673e-03 -0.004183044 0.09992355
#> [5,]  8.216064e-04  0.002603108 0.09764237
#> Test passed
```

```
#> test-theta-diag
#> Running DTVAR with 15 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 15 parameters
#>
#>  Lowest minimum so far:   1520.71770226052
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1520.7177 (started at 4495.7208)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.68173806904188,0.489399546751889,-0.00193767371618495,-0.00911871261291942,0.632637615249167,0.
#> Running DTVAR with 15 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 15 parameters
```

```
#>
#>  Lowest minimum so far:   1681.83095973725
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1681.831 (started at 4581.8287)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.741186828955171,0.462472861839369,-0.141275629798155,-0.0147592051219339,0.590864587003255,0.5
#> Running DTVAR with 15 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 15 parameters
#>
#>  Lowest minimum so far:   1603.75003556341
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1603.75 (started at 4767.6846)  (1 attempt(s):  1 valid,
0 errors)
#>  Start values from best fit:
#> 0.718272508867794,0.521392855751922,-0.109131791835727,0.0069045909428154 5,0.586394874427825,0.4
#> Running DTVAR with 15 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 15 parameters
#>
#>  Lowest minimum so far:   1538.58551939677
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1538.5855 (started at 4823.4713)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.733566657807365,0.57827353932283,-0.0877452138064748,0.0129567317201974,0.589548754315078,0.40
#> Running DTVAR with 15 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 15 parameters
#>
#>  Lowest minimum so far:   1544.69539781223
```

```
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1544.6954 (started at 4343.3781)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.688879136919417,0.416188681780991,-0.20580054945814,-0.00462536313846157,0.686315194753658,0.4
#>
#> Means of the estimated paramaters per individual.
#>      beta_11      beta_21      beta_31      beta_12      beta_22      beta_32
#>  0.712728640  0.493545497 -0.109178172 -0.001728392  0.617152205  0.435119306
#>      beta_13      beta_23      beta_33       psi_11       psi_22       psi_33
#> -0.012605833  0.002336574  0.486531518  0.095861386  0.094720807  0.091069528
#>     theta_11     theta_22     theta_33
#>  0.002411333  0.002725471  0.005384095
#>
#> Estimated paramaters per individual.
#>        beta_11   beta_21      beta_31      beta_12   beta_22   beta_32
#> [1,] 0.6817381 0.4893995 -0.001937674 -0.009118713 0.6326376 0.3469469
#> [2,] 0.7411868 0.4624729 -0.141275630 -0.014759205 0.5908646 0.5102031
#> [3,] 0.7182725 0.5213929 -0.109131792  0.006904591 0.5863949 0.4950146
#> [4,] 0.7335667 0.5782735 -0.087745214  0.012956732 0.5895488 0.4041677
#> [5,] 0.6888791 0.4161887 -0.205800549 -0.004625363 0.6863152 0.4192642
#>           beta_13      beta_23   beta_33     psi_11     psi_22     psi_33
#> [1,]  0.029873491  0.041290567 0.5333528 0.09609980 0.08628040 0.08364089
#> [2,] -0.019361238 -0.002943789 0.4908520 0.09472041 0.10107270 0.09430117
#> [3,]  0.008129541  0.024123901 0.4279590 0.09815973 0.09829693 0.08584384
#> [4,] -0.045627223 -0.027975839 0.5096940 0.09473550 0.08768308 0.09391902
#> [5,] -0.036043734 -0.022811971 0.4707999 0.09559149 0.10027094 0.09764272
#>           theta_11      theta_22      theta_33
#> [1,] 2.225074e-308  9.728982e-03  8.367081e-03
#> [2,]  5.990954e-03 2.225074e-308  4.510171e-03
#> [3,]  1.569902e-05  3.898372e-03  9.281798e-03
#> [4,]  6.050013e-03 2.225074e-308  4.761422e-03
#> [5,] 2.225074e-308 2.225074e-308 2.225074e-308
#> Test passed
```

```
#> test-theta-null
#> Running DTVAR with 12 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 12 parameters
#>
#>  Lowest minimum so far:   1526.00731414896
```

```
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1526.0073 (started at 5699.0002)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.68189327158947 4,0.505053241223708,0.0051086689236398 4,-0.008805340528762 68,0.602624649024426,0
#> Running DTVAR with 12 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 12 parameters
#>
#>  Lowest minimum so far:   1683.45326767594
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1683.4533 (started at 5881.5124)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.71480467820456,0.446703808115241,-0.137212069780235,-0.002862244728575 26,0.597355831530442,0.5
#> Running DTVAR with 12 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 12 parameters
#>
#>  Lowest minimum so far:   1605.51702315237
#>
#> Solution found
```

```
#>
#>  Solution found!   Final fit=1605.517 (started at 6215.4721)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.71807819288672,0.528392528302594,-0.104829115204023,0.007327506998246 01,0.574300325081348,0.49
#> Running DTVAR with 12 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 12 parameters
#>
#>  Lowest minimum so far:   1540.5851271712
#>
#> Solution found
```

```
#>
#>  Solution found!  Final fit=1540.5851 (started at 6304.8811)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.704947412341599,0.554348582548788,-0.0873190665196664,0.0246870702290564,0.59942291603357,0.409
#> Running DTVAR with 12 parameters
#>
#> Beginning initial fit attempt
#> Running DTVAR with 12 parameters
#>
#>  Lowest minimum so far:  1544.69539781234
#>
#> Solution found
```

```
#>
#>  Solution found!  Final fit=1544.6954 (started at 5426.6766)  (1 attempt(s):  1
valid, 0 errors)
#>  Start values from best fit:
#> 0.688878981232639,0.416188669542742,-0.20580061653624,-0.00462533218292364,0.686315213100752,0.41

#>
#> Means of the estimated paramaters per individual.
#>      beta_11      beta_21      beta_31      beta_12      beta_22      beta_32
#>  0.701720507  0.490137366 -0.106010440  0.003144332  0.612003787  0.435809022
#>      beta_13      beta_23      beta_33       psi_11       psi_22       psi_33
#> -0.014208231  0.006029603  0.476983836  0.099522285  0.099143080  0.098132339
#>
#> Estimated paramaters per individual.
#>        beta_11   beta_21      beta_31      beta_12   beta_22   beta_32
#> [1,] 0.6818933 0.5050532  0.005108669 -0.008805341 0.6026246 0.3434339
#> [2,] 0.7148047 0.4467038 -0.137212070 -0.002862245 0.5973558 0.5128712
#> [3,] 0.7180782 0.5283925 -0.104829115  0.007327507 0.5743003 0.4944582
#> [4,] 0.7049474 0.5543486 -0.087319067  0.024687070 0.5994229 0.4090176
#> [5,] 0.6888790 0.4161887 -0.205800617 -0.004625332 0.6863152 0.4192641
#>           beta_13     beta_23   beta_33     psi_11     psi_22     psi_33
#> [1,]  0.028747443  0.05647696 0.5183946 0.09611174 0.09990712 0.09533265
#> [2,] -0.024206171 -0.00479118 0.4822680 0.10395017 0.10226569 0.10002056
#> [3,]  0.007524542  0.03085868 0.4148173 0.09818538 0.10348889 0.09775023
#> [4,] -0.047063127 -0.02958436 0.4986395 0.10377264 0.08978277 0.09991550
#> [5,] -0.036043841 -0.02281209 0.4707998 0.09559150 0.10027094 0.09764276
#> Test passed
#> [[1]]
#> [[1]][[1]]
#> [[1]][[1]]$value
#> [[1]][[1]]$value[[1]]
#> [1] TRUE
```

```
#>
#>
#> [[1]][[1]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[2]]
#> [[1]][[2]]$value
#> [[1]][[2]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[2]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[3]]
#> [[1]][[3]]$value
#> [[1]][[3]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[3]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[4]]
#> [[1]][[4]]$value
#> [[1]][[4]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[4]]$visible
#> [1] TRUE
```

Environment

```
ls()

#> [1] "root"
```

Class

```
#> [[1]]
#> [1] "root_criterion"
```

References

R Core Team. (2024). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. Vienna, Austria. https://www.R-project.org/