Report

[1]

[1]unaffiliated

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1 Report Metadata

- Version: `0.1.0`
- Date: `October 29, 2022`
- User: `tchamzas`

2 Equations

2.1 FOCE, LaplaceI, NaivePooled, and FOCE_constantcoef

2.1.1 `@pre`

$$CL = tvcl \cdot e^{\eta_1} \tag{1}$$
$$Vc = tvvc \cdot e^{\eta_2} \tag{2}$$

2.1.2 `@param`

$$tvcl \in \text{RealDomain}\left(; lower = 0.001\right) \tag{3}$$
$$tvvc \in \text{RealDomain}\left(; lower = 0.001\right) \tag{4}$$
$$\Omega \in \text{PDiagDomain}\left(2\right) \tag{5}$$
$$\sigma \in \text{RealDomain}\left(; lower = 0.001\right) \tag{6}$$

2.1.3 `@random`

$$\eta \sim \text{MvNormal}\left(\Omega\right) \tag{7}$$

2.1.4 `@dynamics`

$$\frac{dCentral(t)}{dt} = \left(-\frac{CL}{Vc}\right) \cdot Central(t) \tag{8}$$

2.1.5 `@derived`

$$cp = \frac{1000 \cdot Central}{Vc} \tag{9}$$
$$dv \sim \text{Normal}\left(cp, \sigma\right) \tag{10}$$

3 Model Metrics

Table 1: Listing of fit metrics for (FOCE)

Metric	Value
Estimation Time	1.268
LogLikelihood (LL)	-11556.9
$-2LL$	23113.8
AIC	23123.8
BIC	23151.3
(η-shrinkage) η_1	0.282
(η-shrinkage) η_2	0.137
(ϵ-shrinkage) dv	0.043

Table 2: Listing of fit metrics for (FOCE_constantcoef)

Metric	**Value**
Estimation Time	0.54
LogLikelihood (LL)	-11701.8
$-2LL$	23403.6
AIC	23411.6
BIC	23433.6
(η-shrinkage) η_1	0.731
(η-shrinkage) η_2	0.142
(ϵ-shrinkage) dv	0.056

Table 3: Listing of fit metrics for (LaplaceI)

Metric	Value
Estimation Time	0.838
LogLikelihood (LL)	-11557.0
$-2LL$	23113.9
AIC	23123.9
BIC	23151.4
(η-shrinkage) η_1	0.283
(η-shrinkage) η_2	0.137
(ϵ-shrinkage) dv	0.043

Table 4: Listing of fit metrics for (NaivePooled)

Metric	Value
Estimation Time	0.068
LogLikelihood (LL)	-12269.5
$-2LL$	24539.0
AIC	24545.0
BIC	24561.5
(η-shrinkage) η_1	NaN
(η-shrinkage) η_2	NaN
(ϵ-shrinkage) dv	NaN

4 Coefficient Tables

Table 5: Population parameters of the (FOCE) fit.

Parameter	**Estimate**
$tvcl$	3.755
$tvvc$	70.012
$\Omega_{1,1}$	0.081
$\Omega_{2,2}$	0.082
σ	133.362

Table 6: Population parameters of the (FOCE_constantcoef) fit.

Parameter	Estimate
$tvcl$	1.0
$tvvc$	71.693
$\Omega_{1,1}$	1.706
$\Omega_{2,2}$	0.086
σ	134.526

Table 7: Population parameters of the (LaplaceI) fit.

Parameter	Estimate
$tvcl$	3.748
$tvvc$	70.244
$\Omega_{1,1}$	0.081
$\Omega_{2,2}$	0.082
σ	133.354

Table 8: Population parameters of the (NaivePooled) fit.

Parameter	Estimate
$tvcl$	3.839
$tvvc$	64.717
$\Omega_{1,1}$	NaN
$\Omega_{2,2}$	NaN
σ	221.683

5 Data Checkout Plots

The following pages contain the data checkout plots for all the fitted models included in the report. One plot is displayed per page.

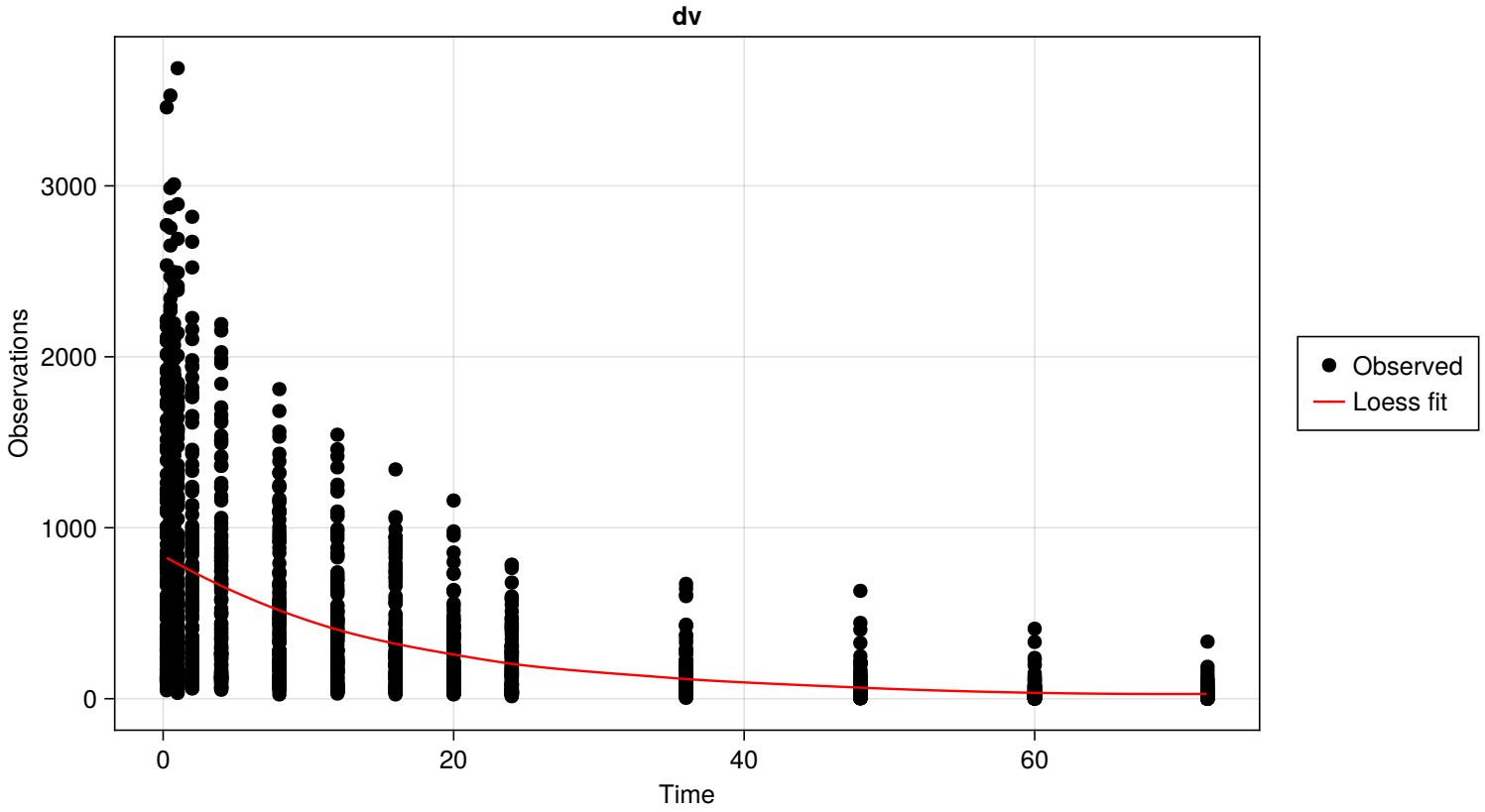

Figure 1: FOCE, LaplaceI, NaivePooled, and FOCE_constantcoef: Observed (dv) vs Time profiles (1 of 1).

6 Fitted Model Plots

The following pages contain the plots for all the fitted models included in the report. One plot is displayed per page.

6.1 FOCE

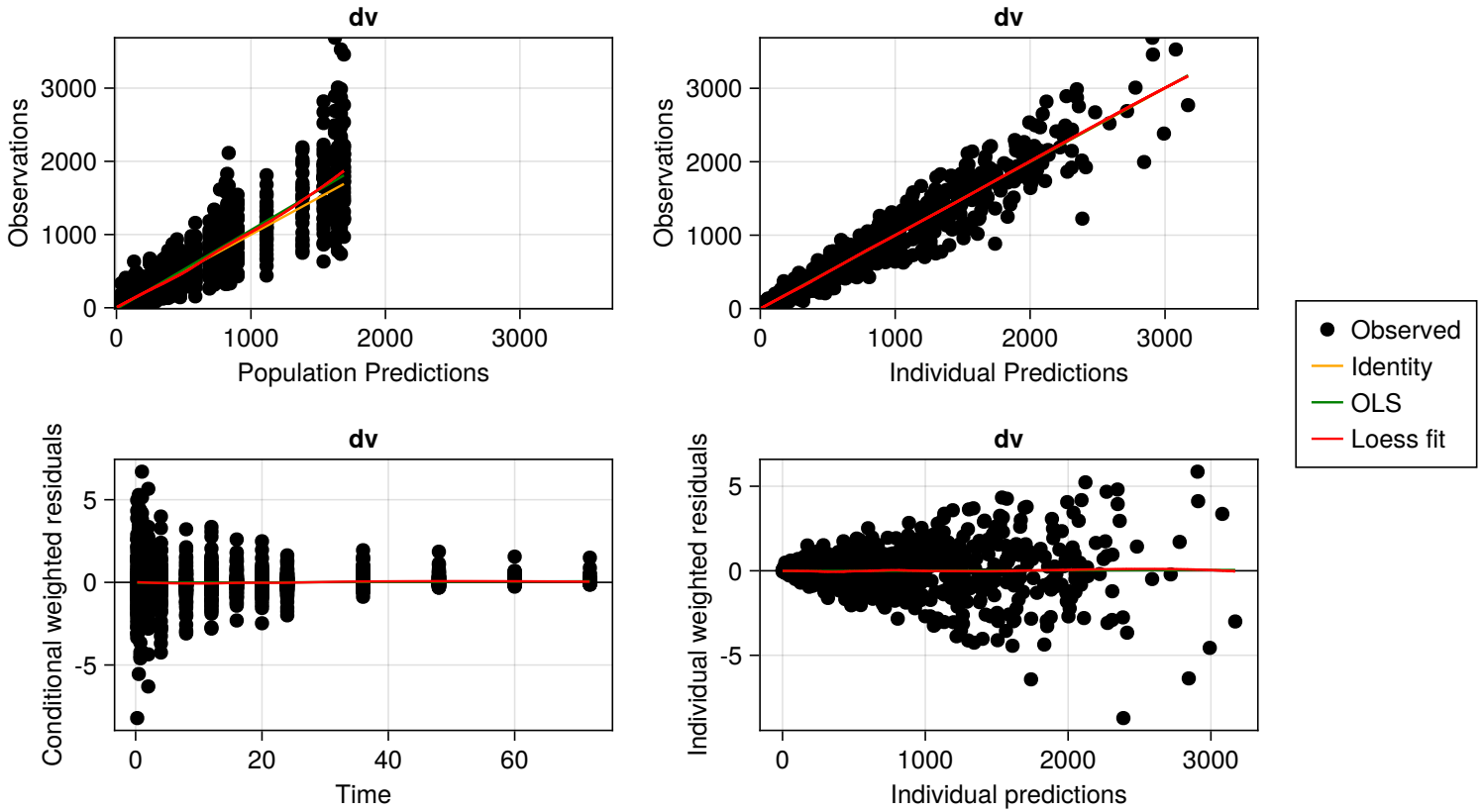

Figure 2: FOCE: Goodness of fit plots showcasing observations (dv) versus population and individual predictions (top panel) and, weighted residuals (dv) vs population predictions and individual weighted residuals vs time (bottom panel) (1 of 1)

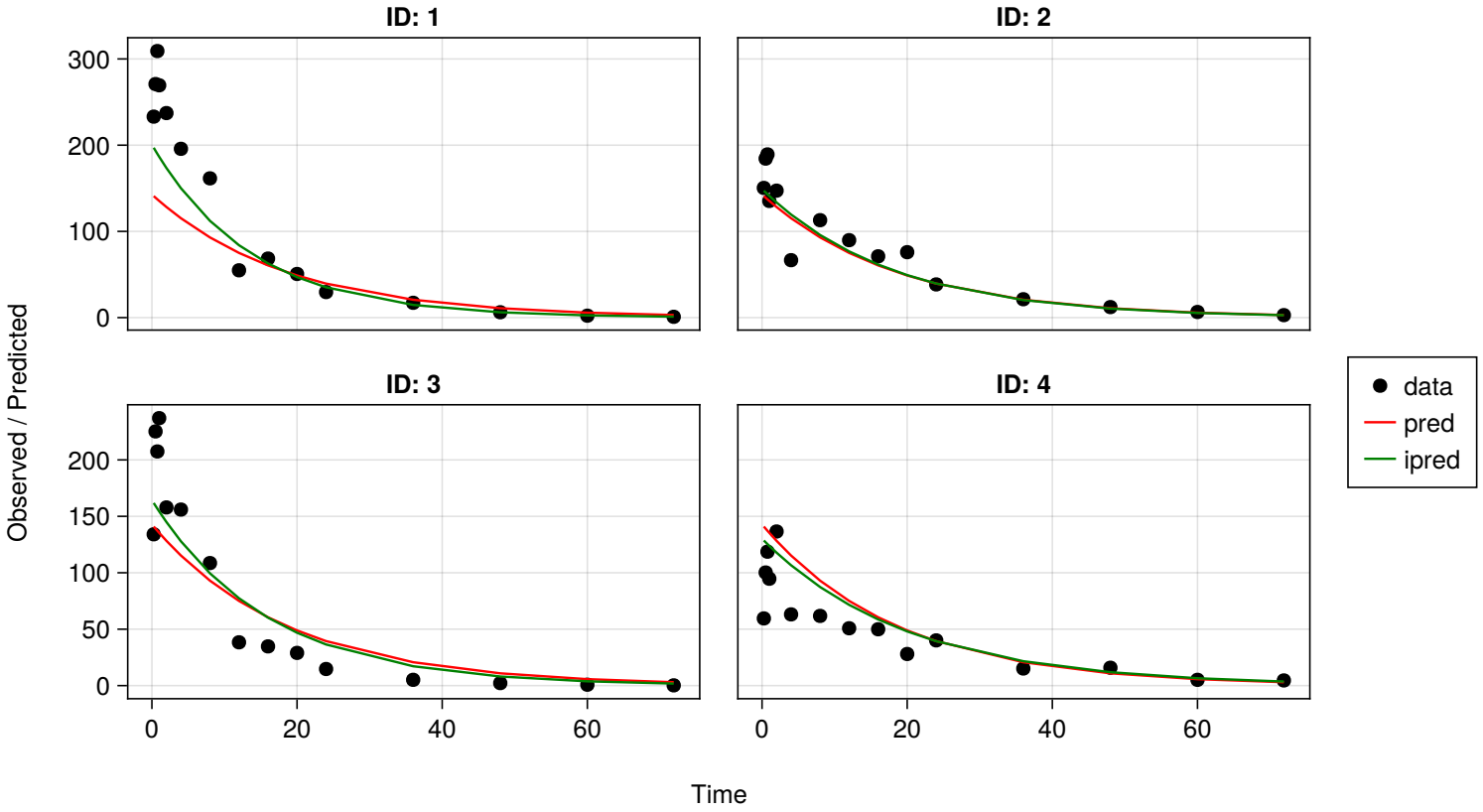

Figure 3: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (1 of 30)

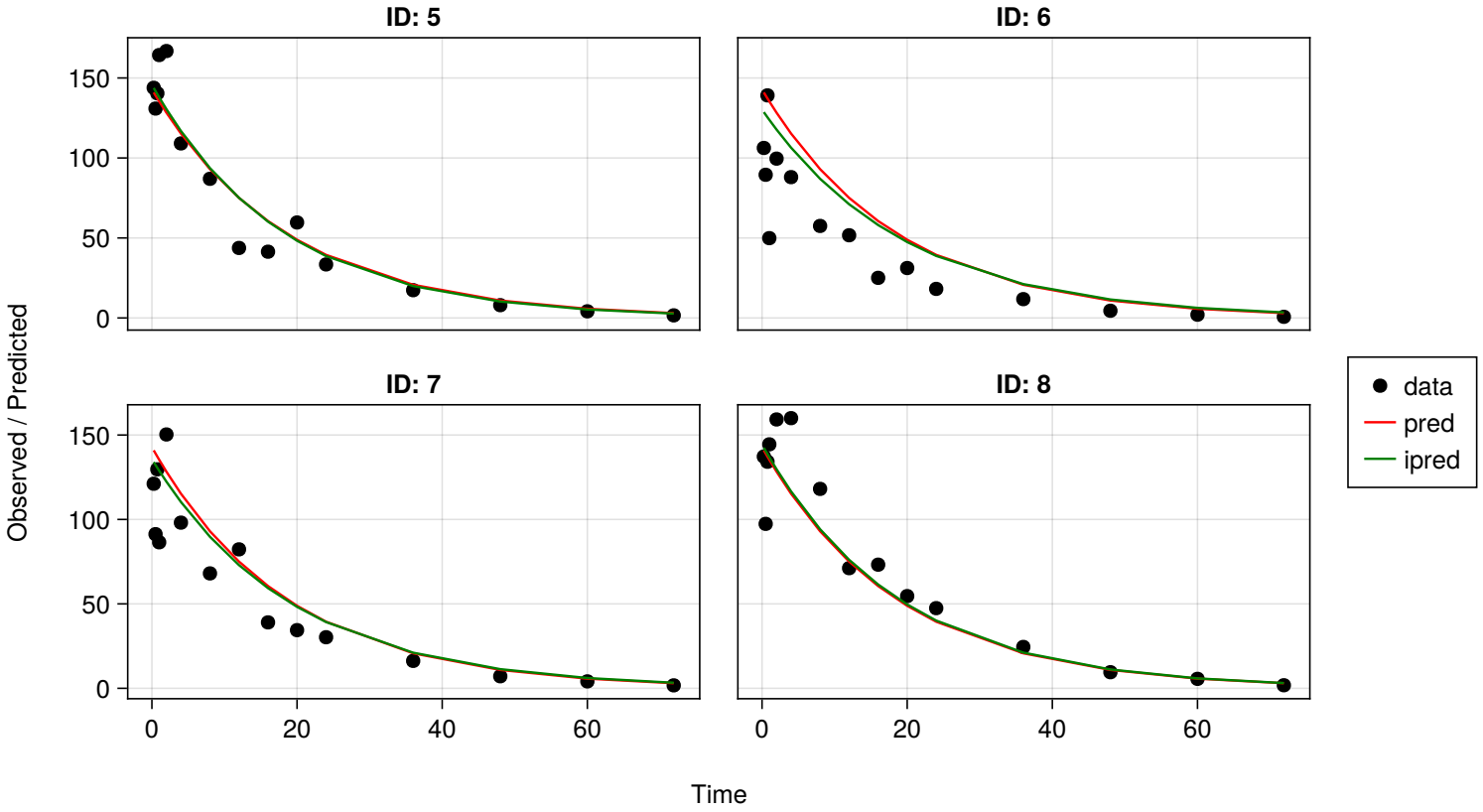

Figure 4: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (2 of 30)

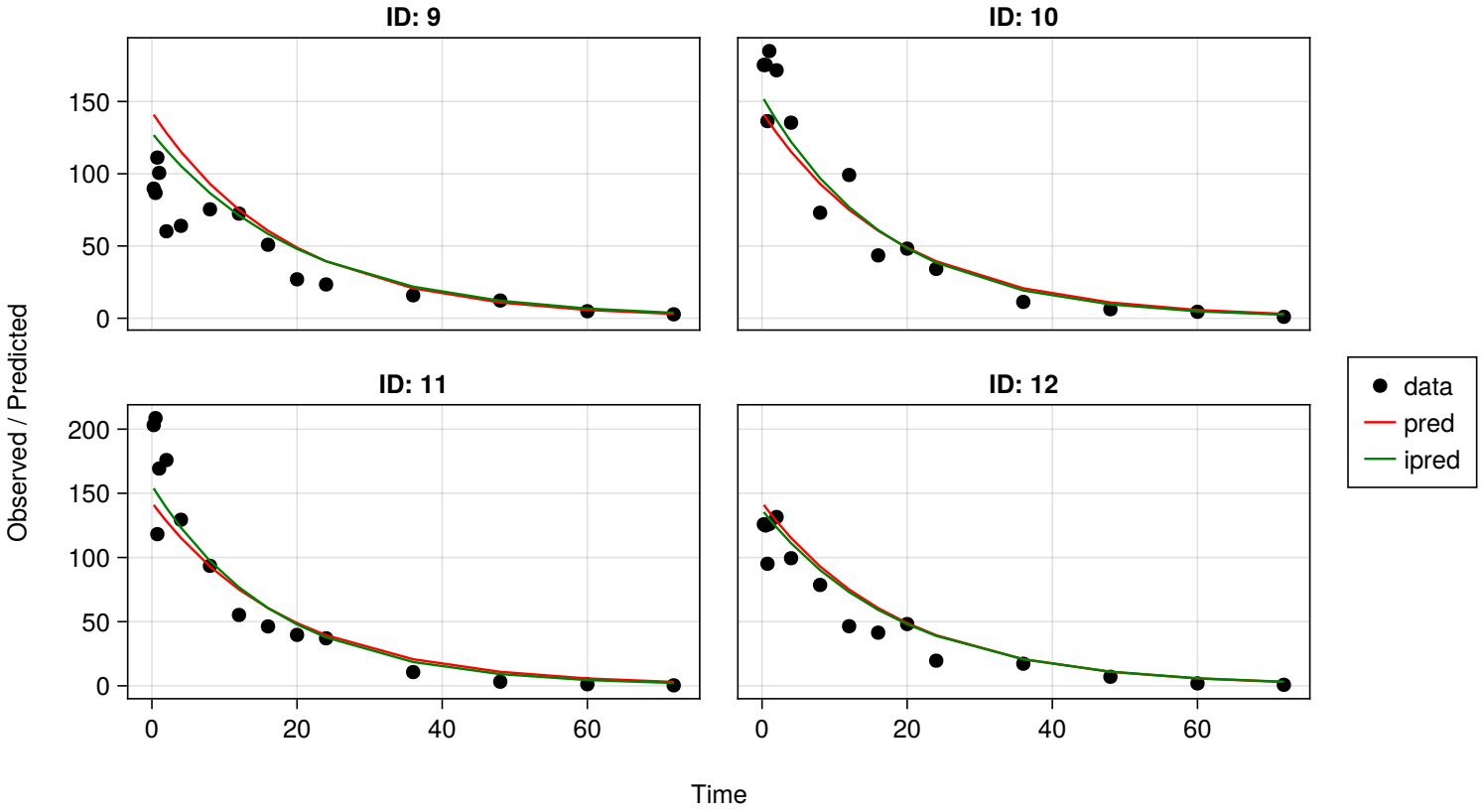

Figure 5: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (3 of 30)

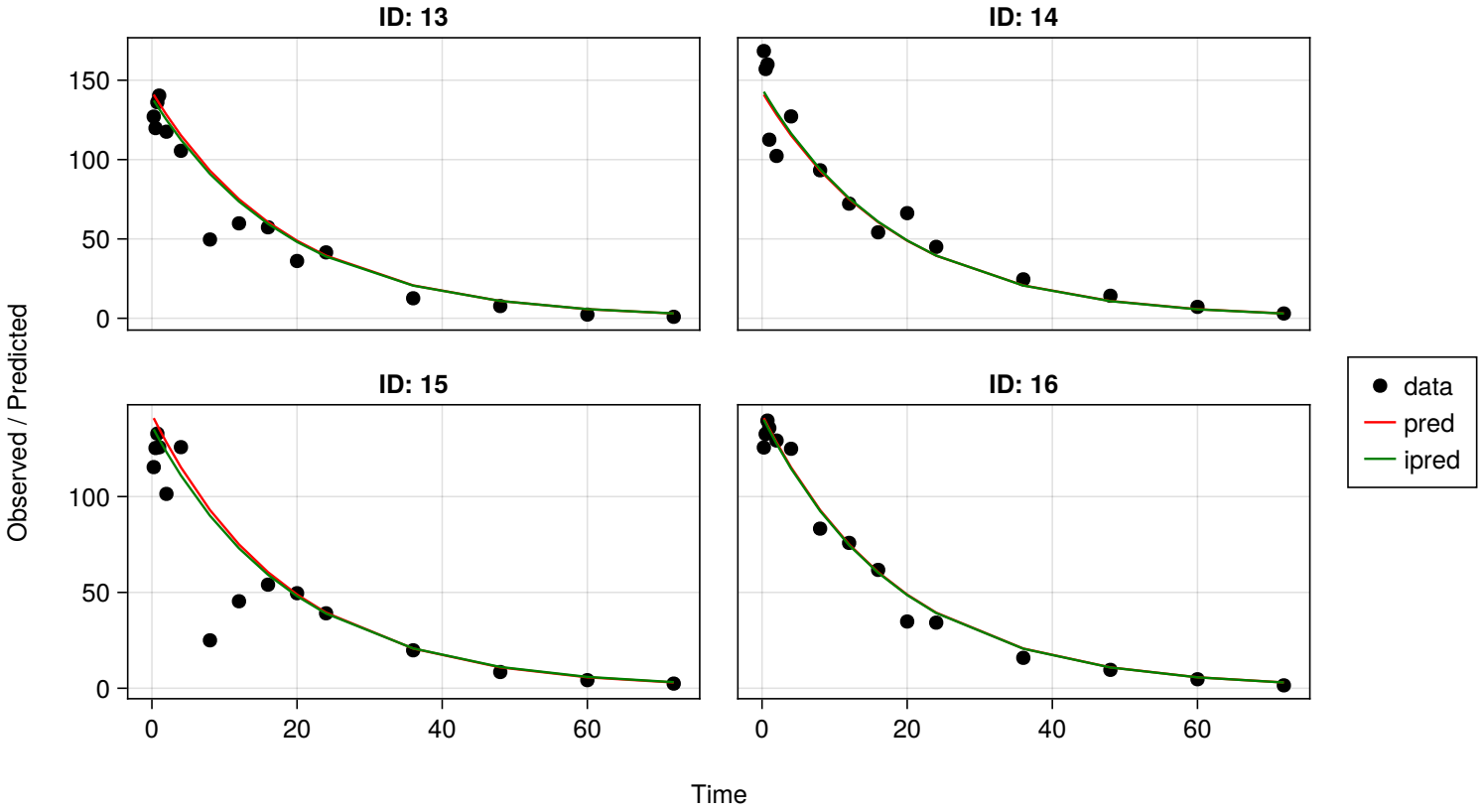

Figure 6: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (4 of 30)

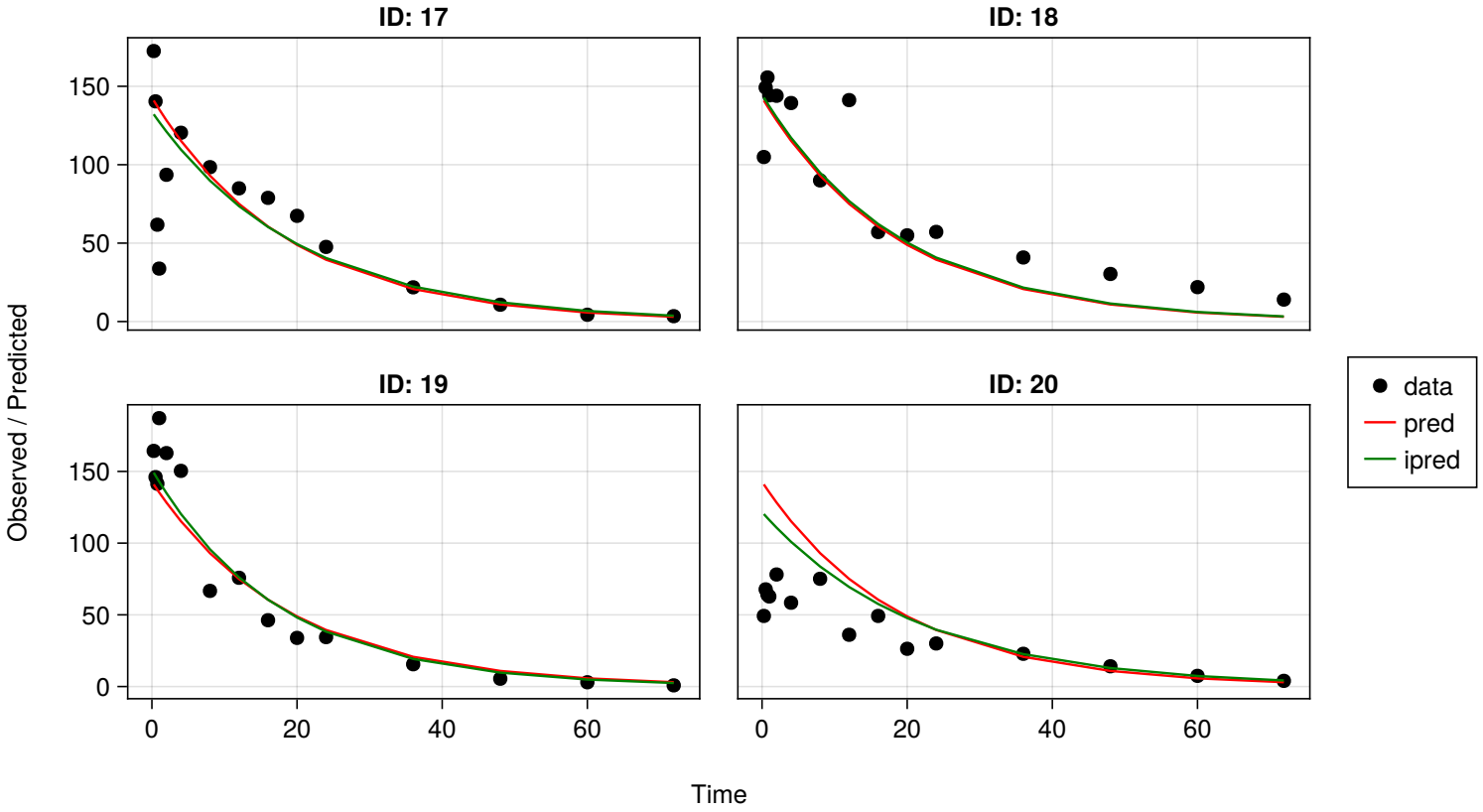

Figure 7: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (5 of 30)

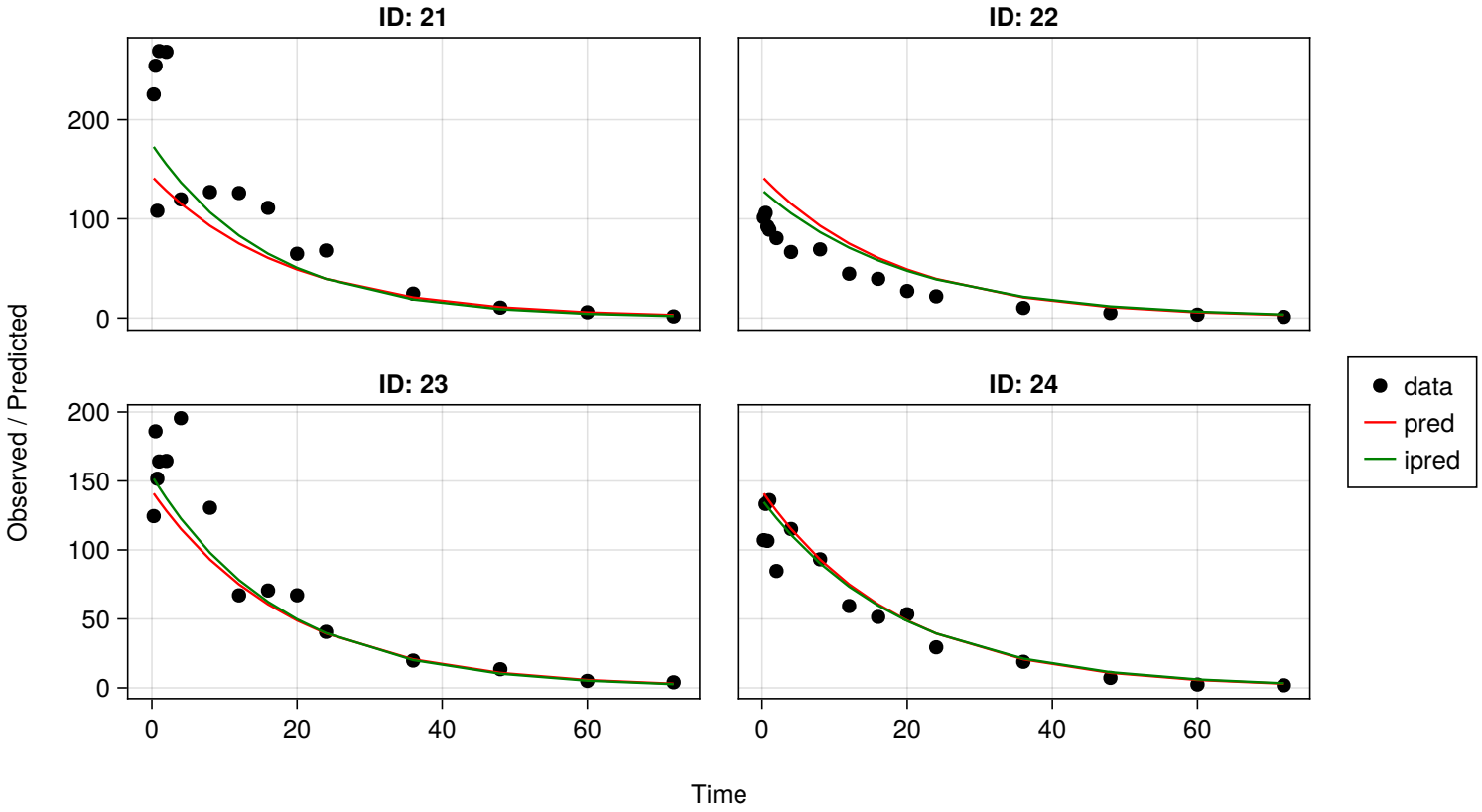

Figure 8: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (6 of 30)

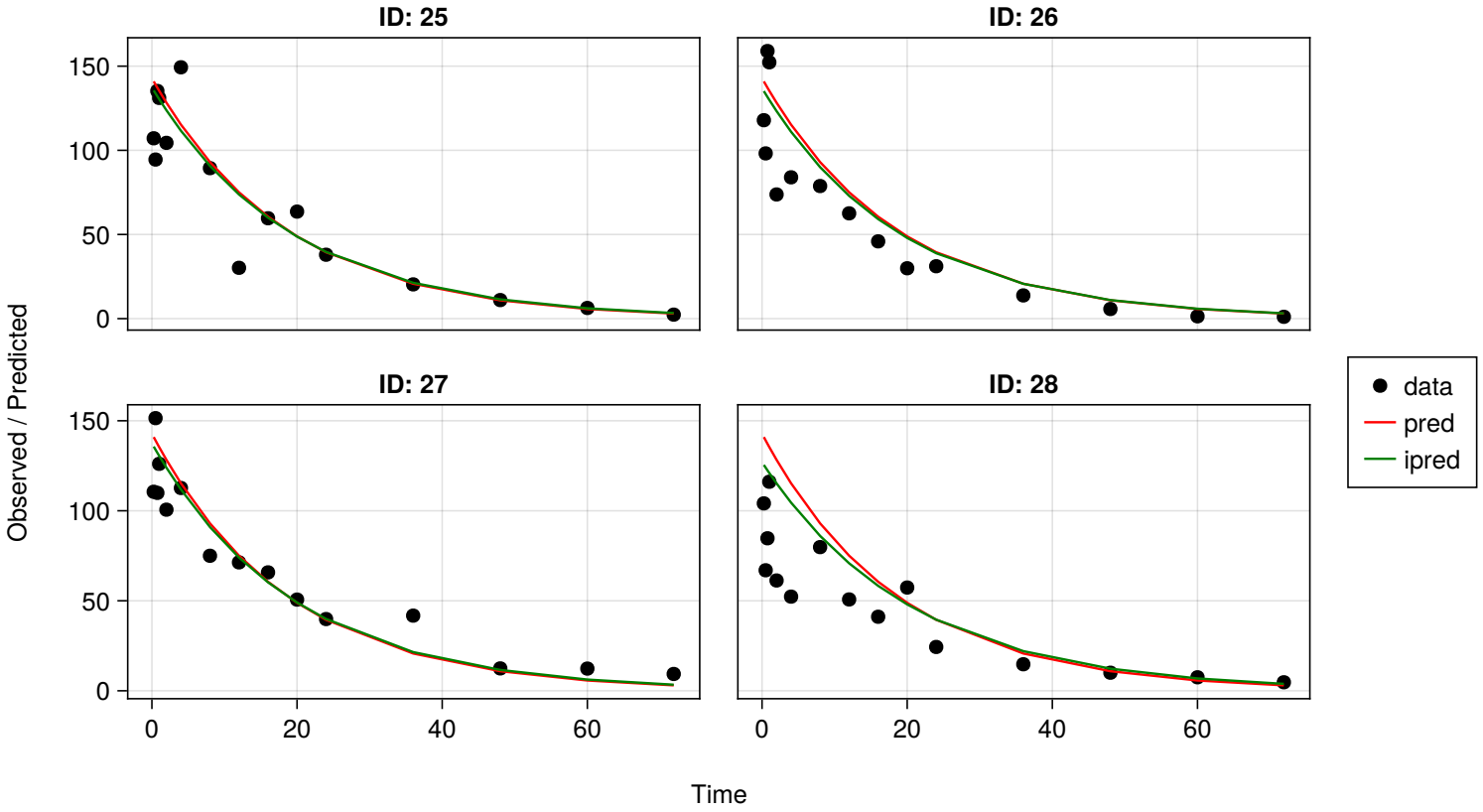

Figure 9: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (7 of 30)

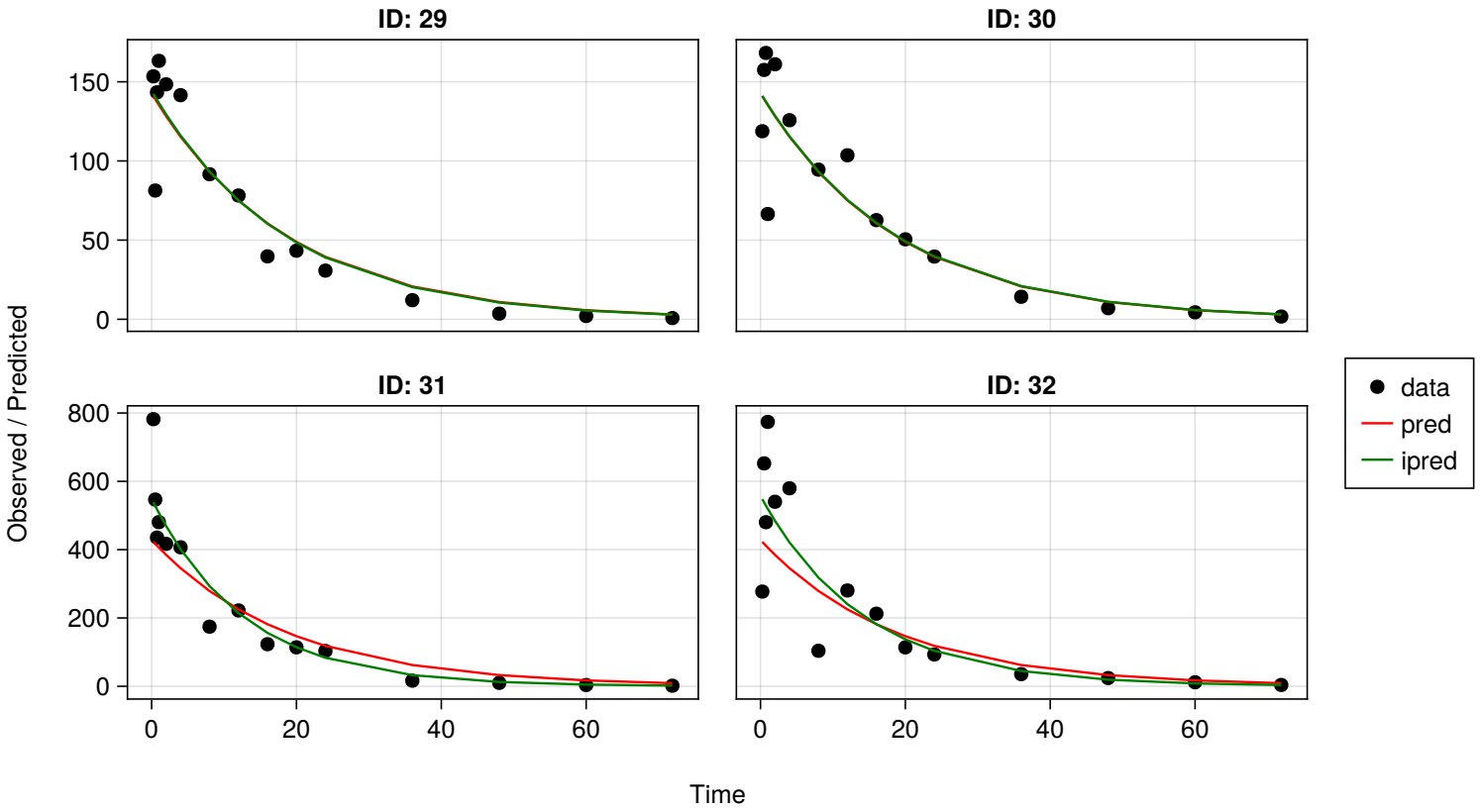

Figure 10: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (8 of 30)

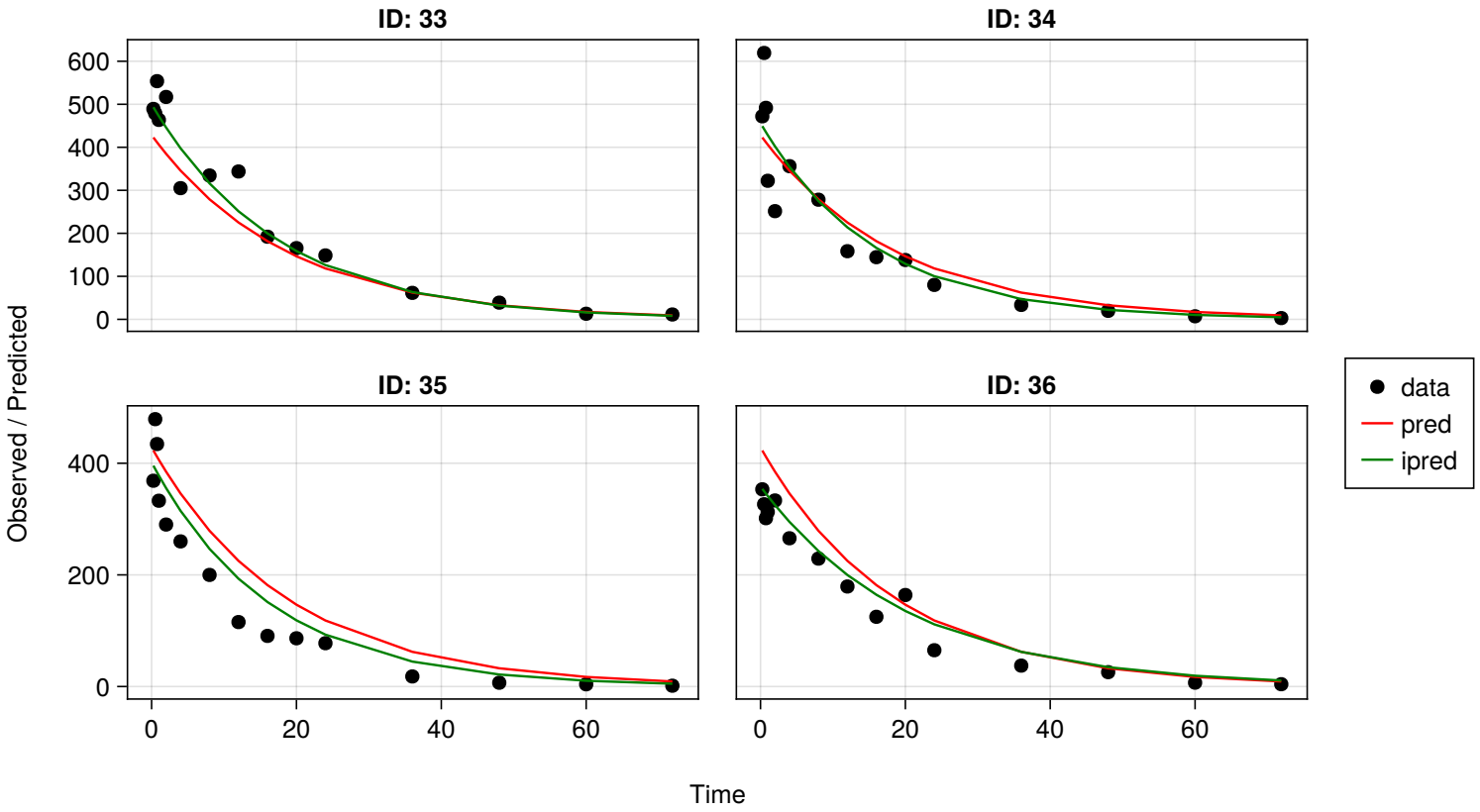

Figure 11: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (9 of 30)

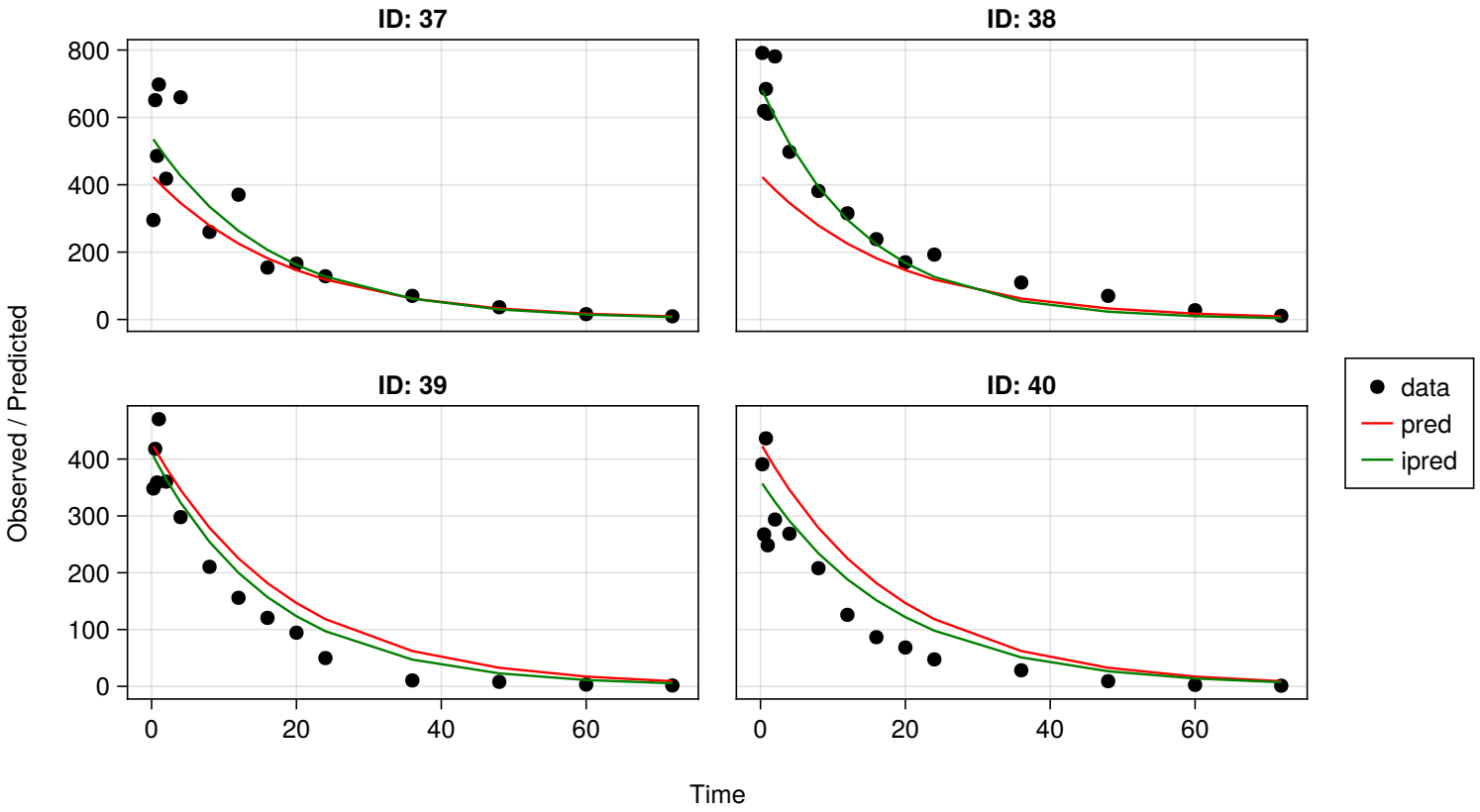

Figure 12: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (10 of 30)

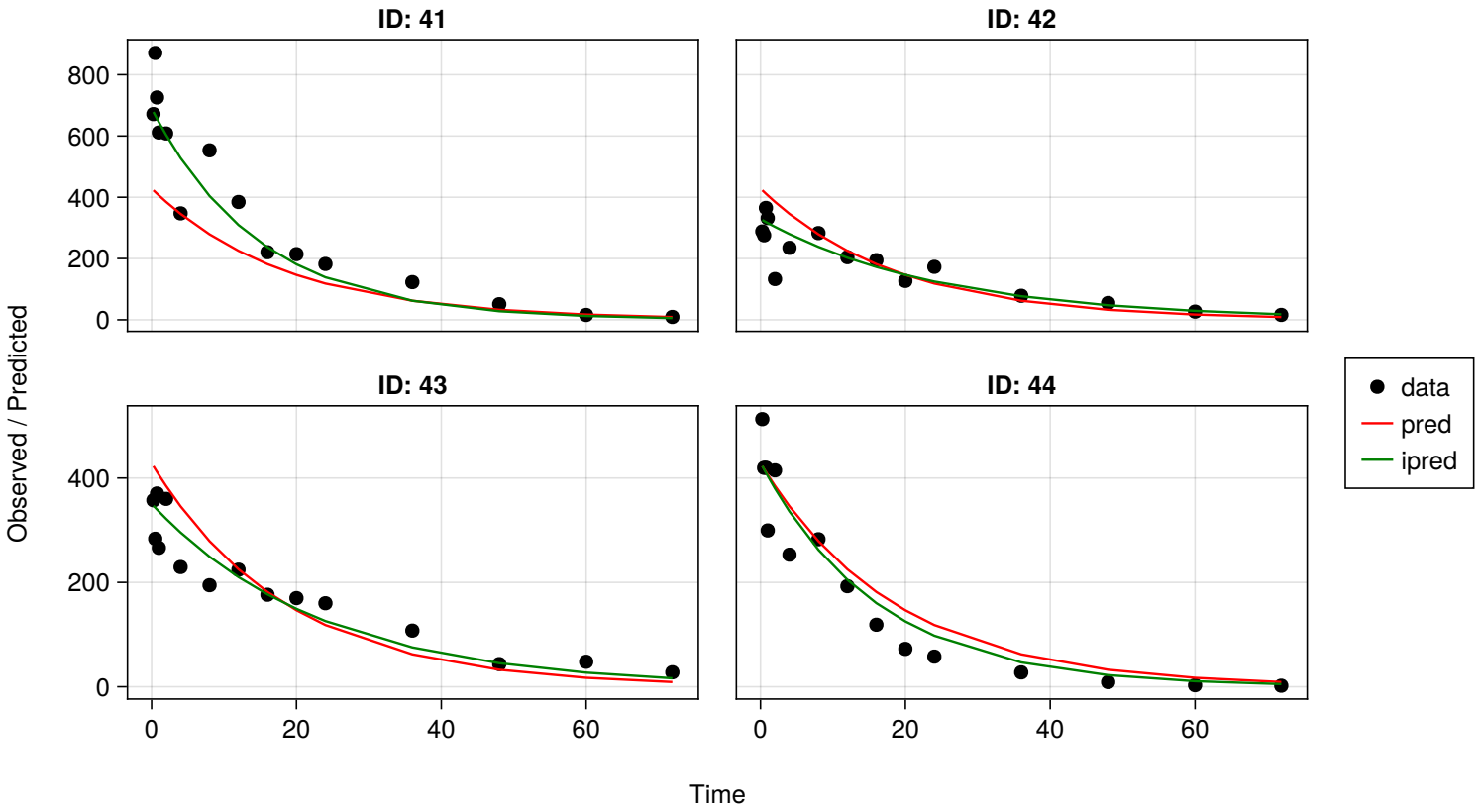

Figure 13: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (11 of 30)

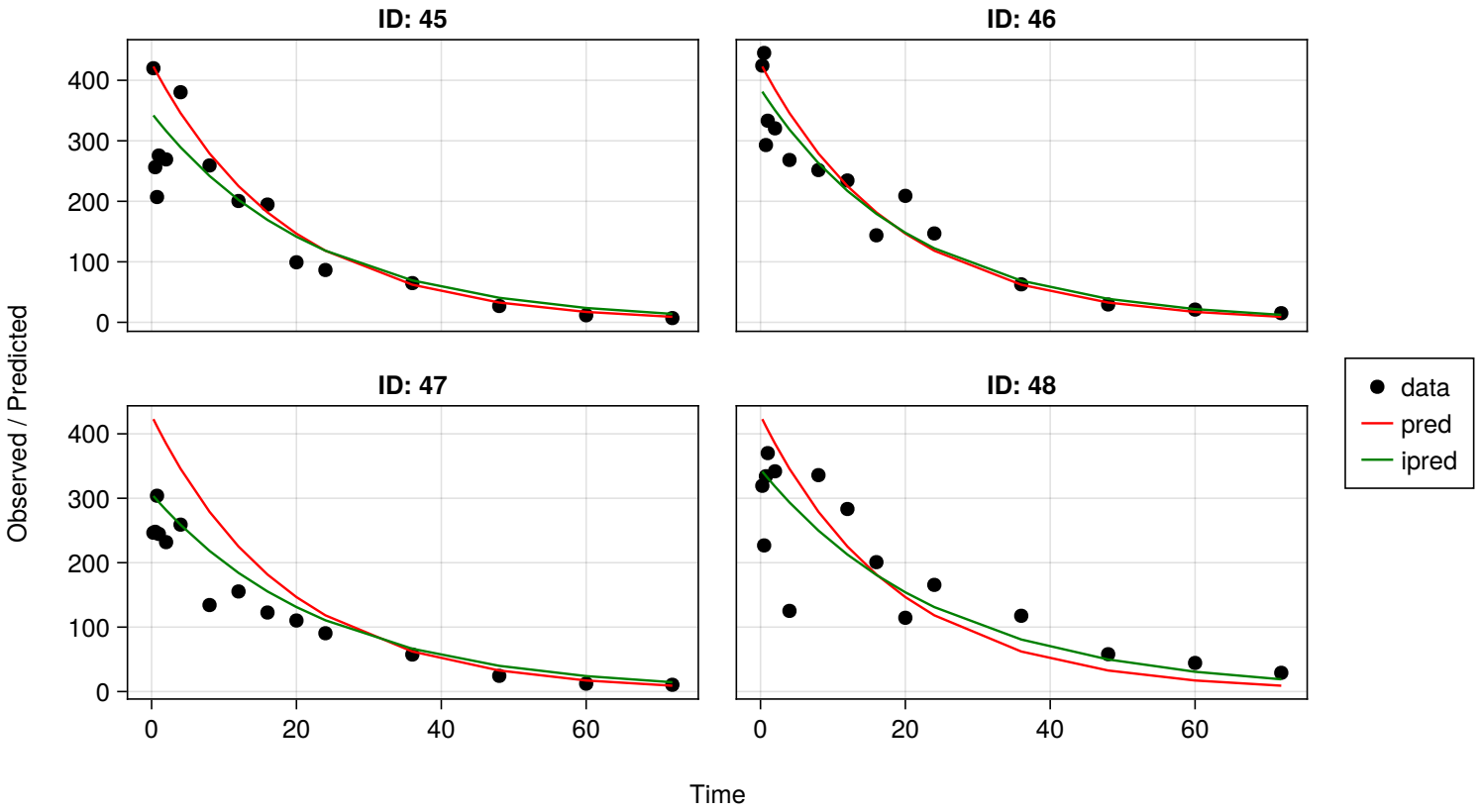

Figure 14: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (12 of 30)

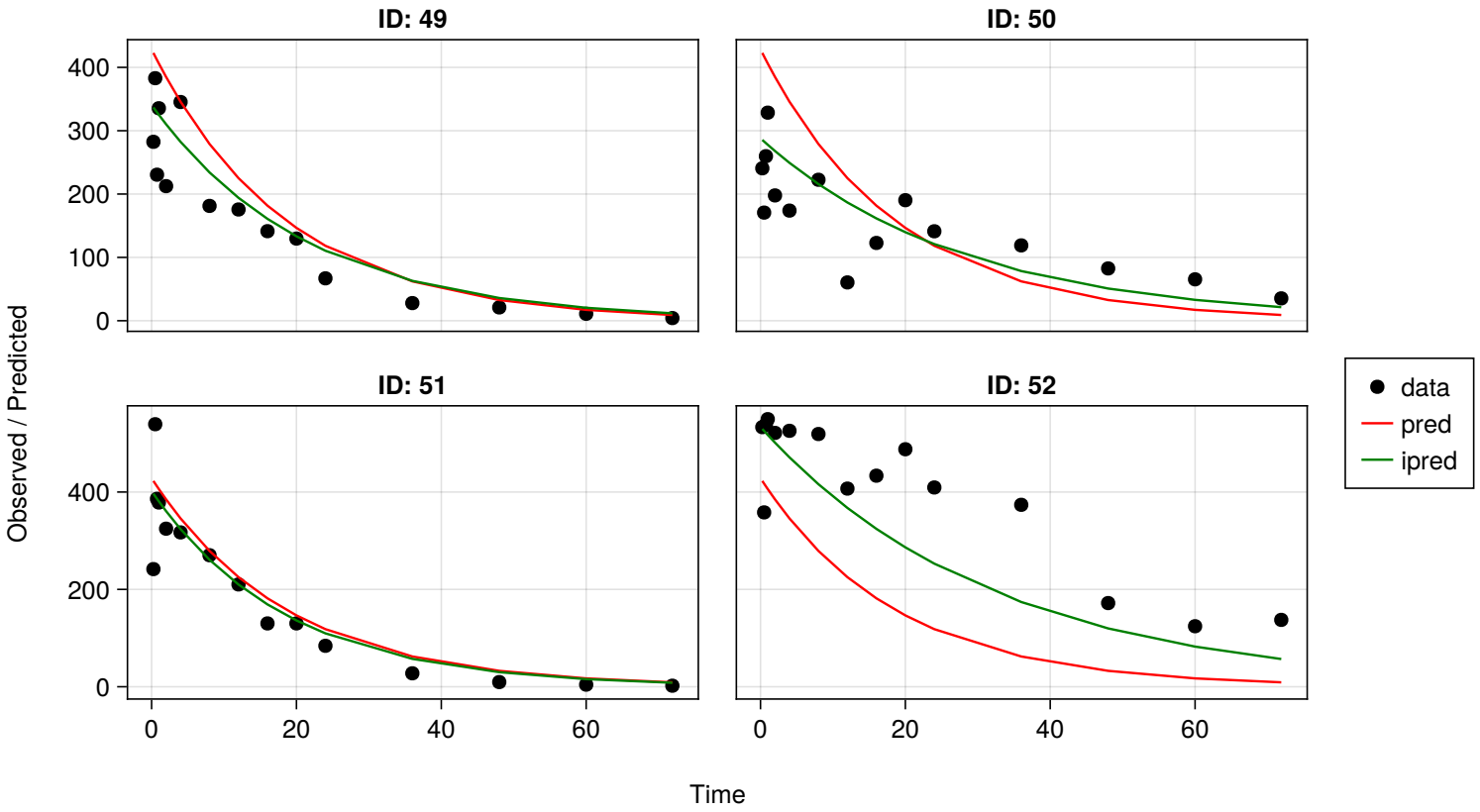

Figure 15: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (13 of 30)

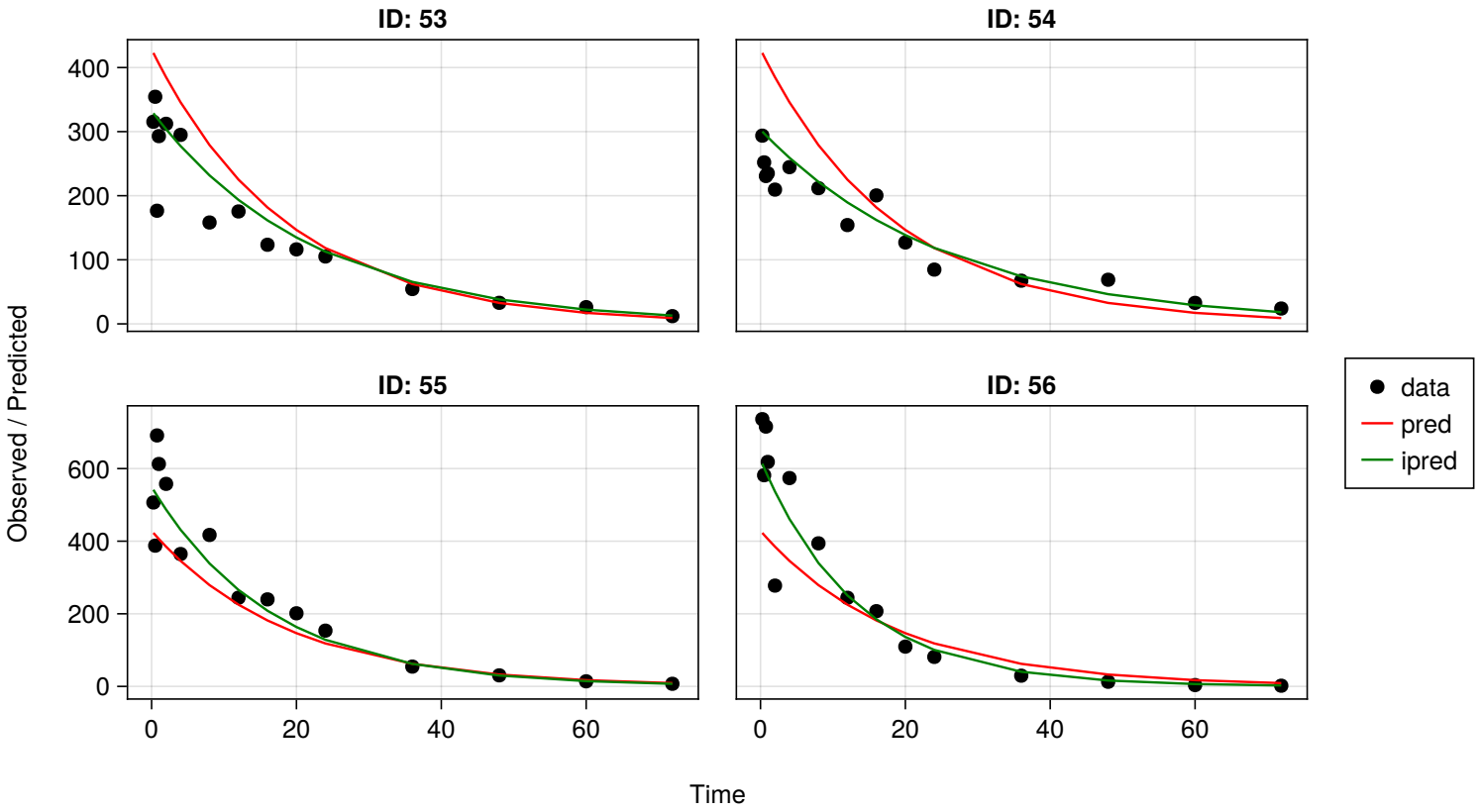

Figure 16: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (14 of 30)

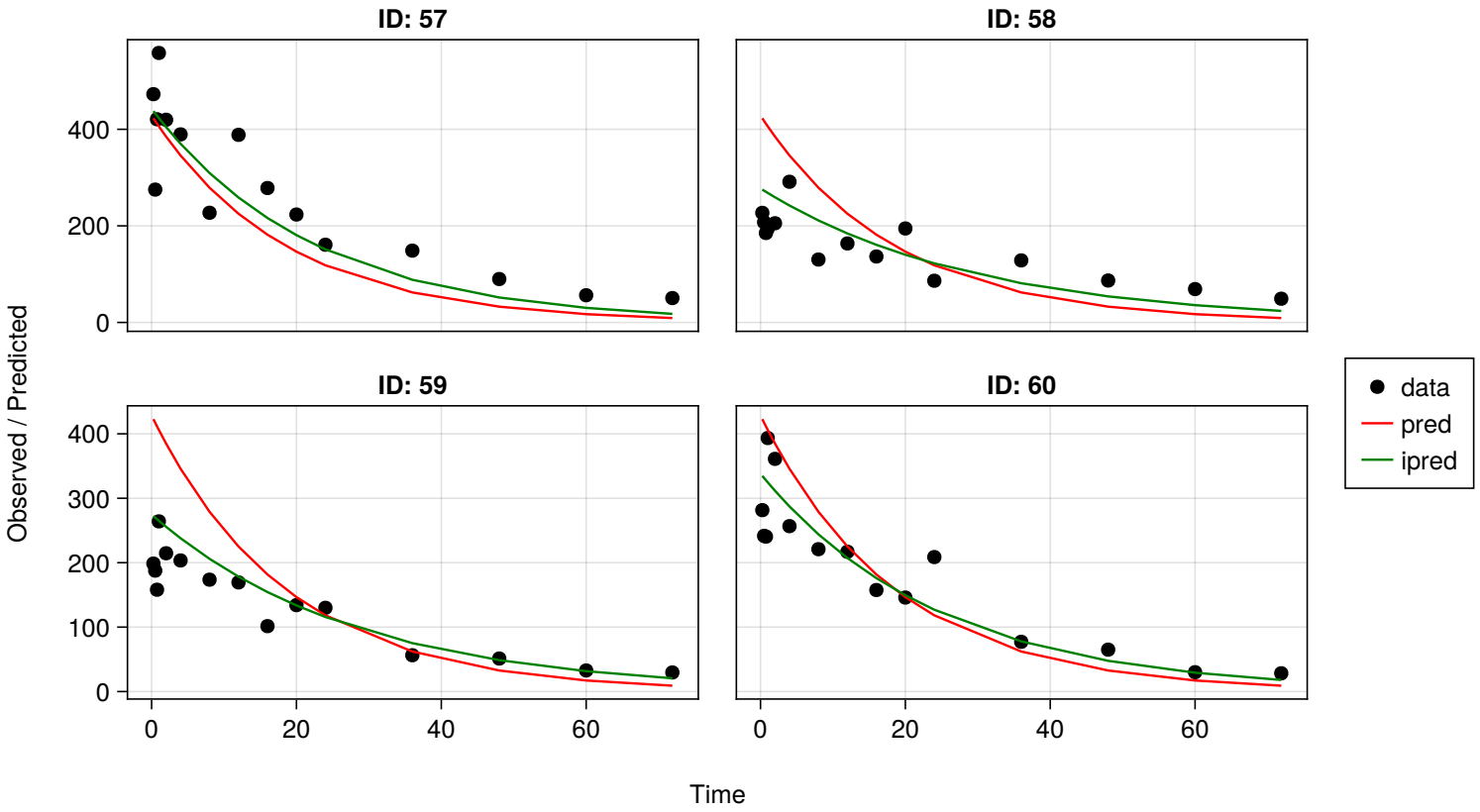

Figure 17: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (15 of 30)

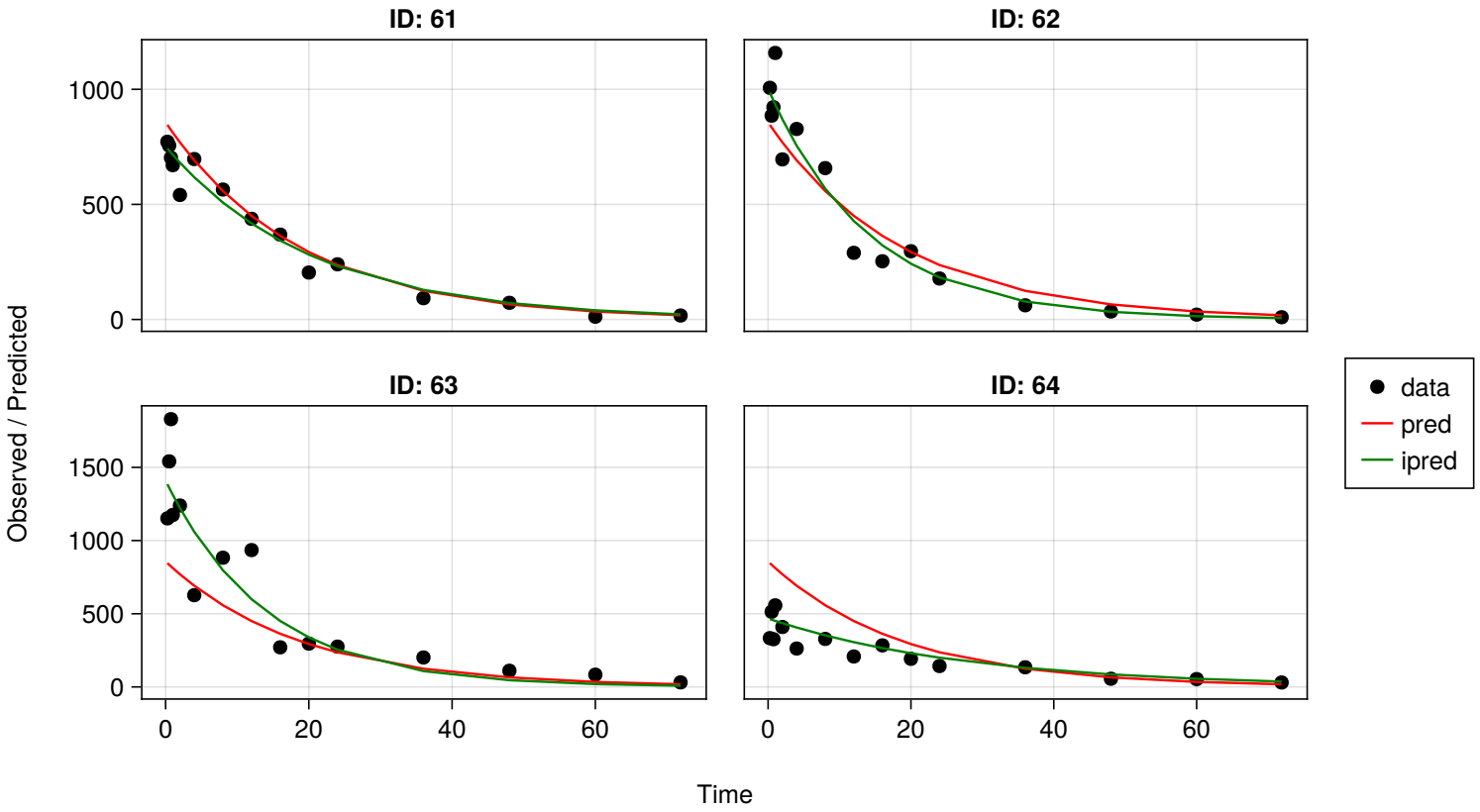

Figure 18: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (16 of 30)

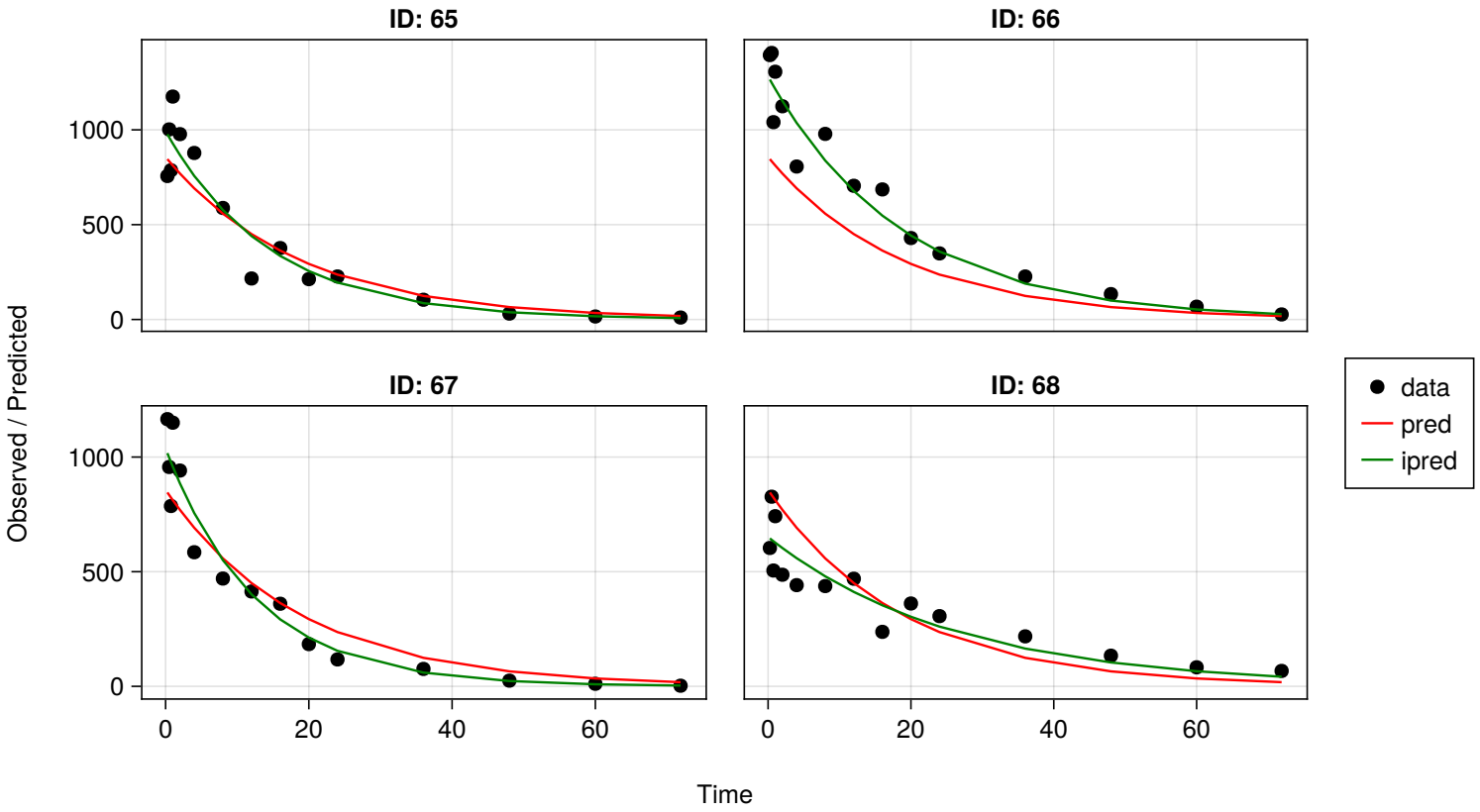

Figure 19: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (17 of 30)

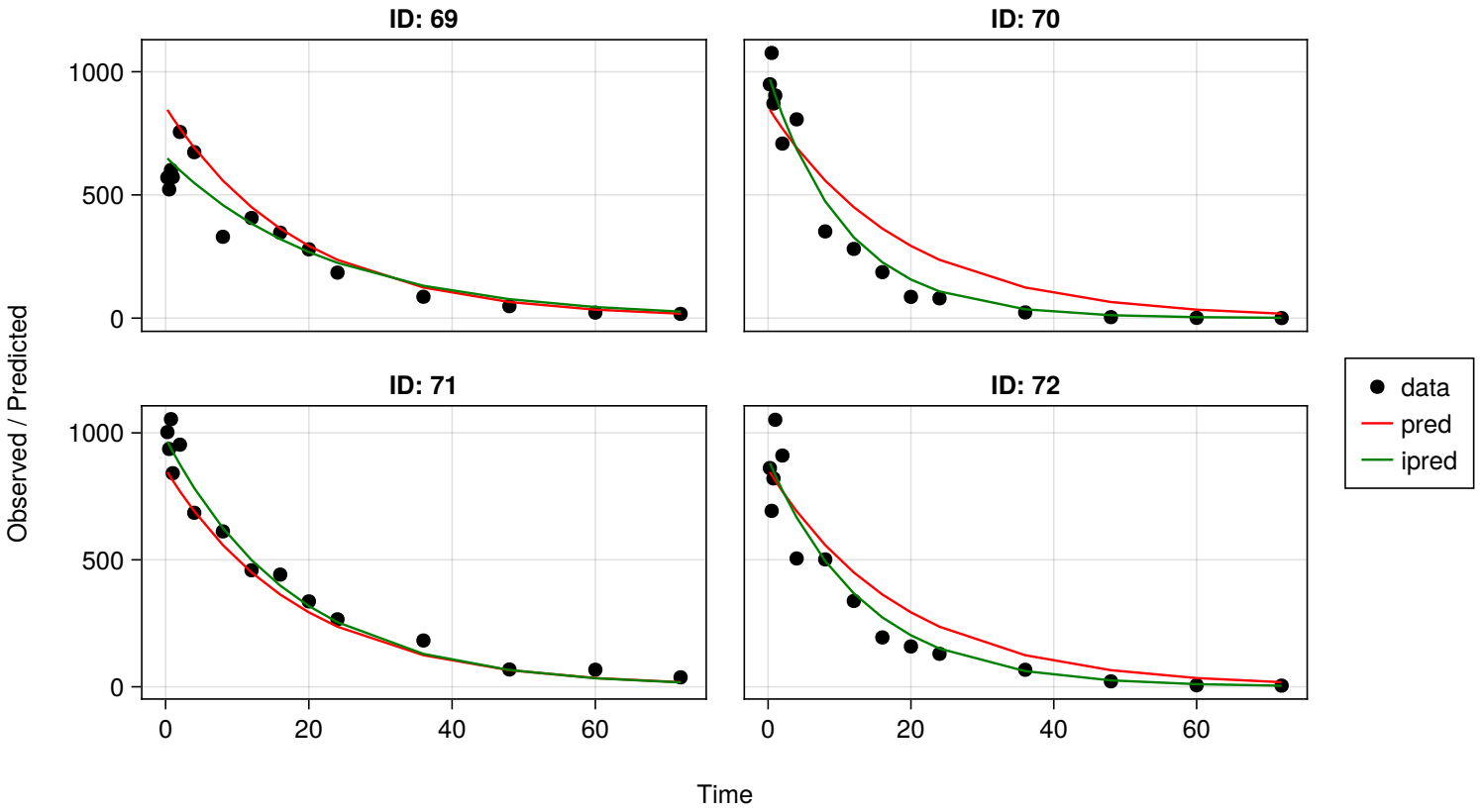

Figure 20: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (18 of 30)

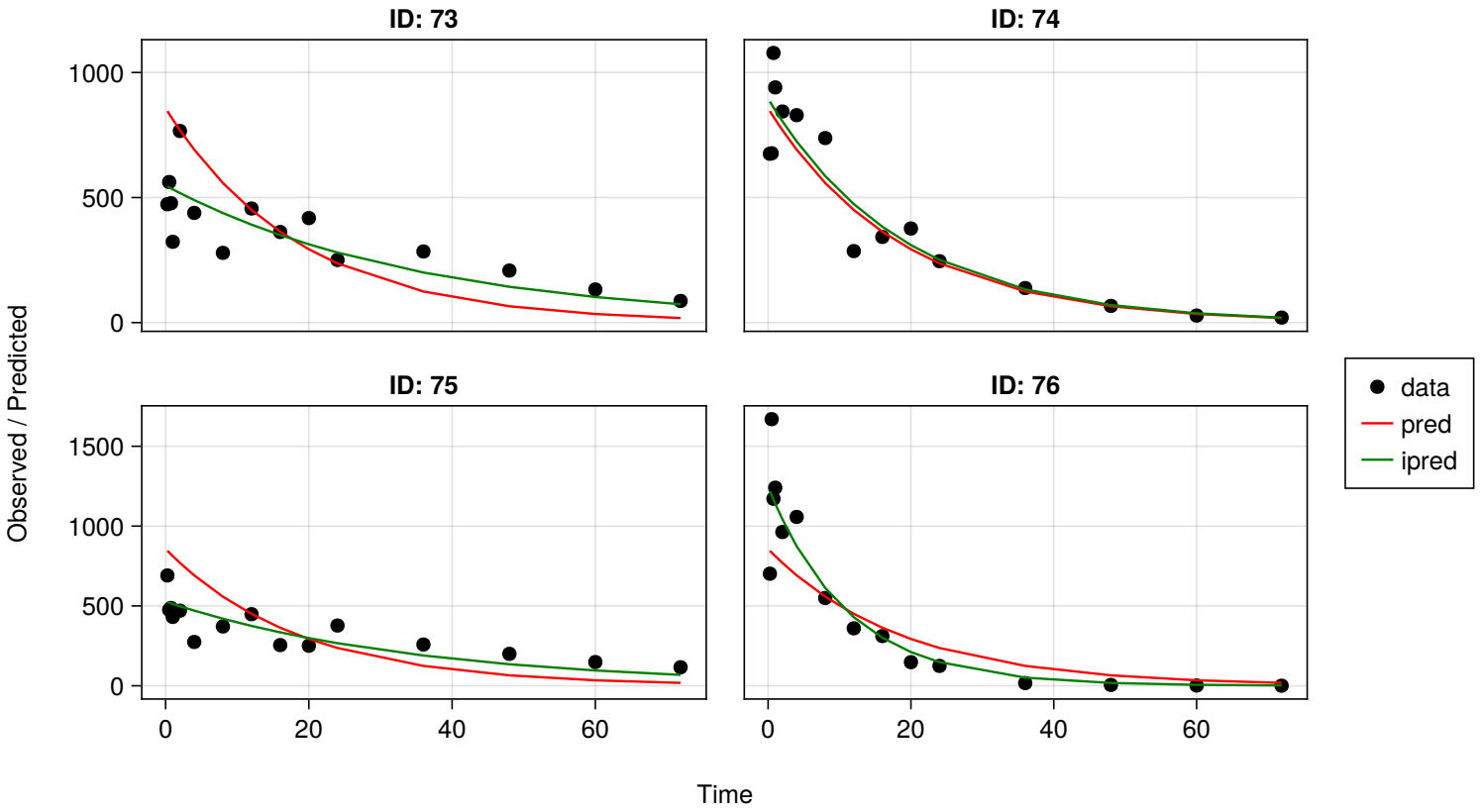

Figure 21: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (19 of 30)

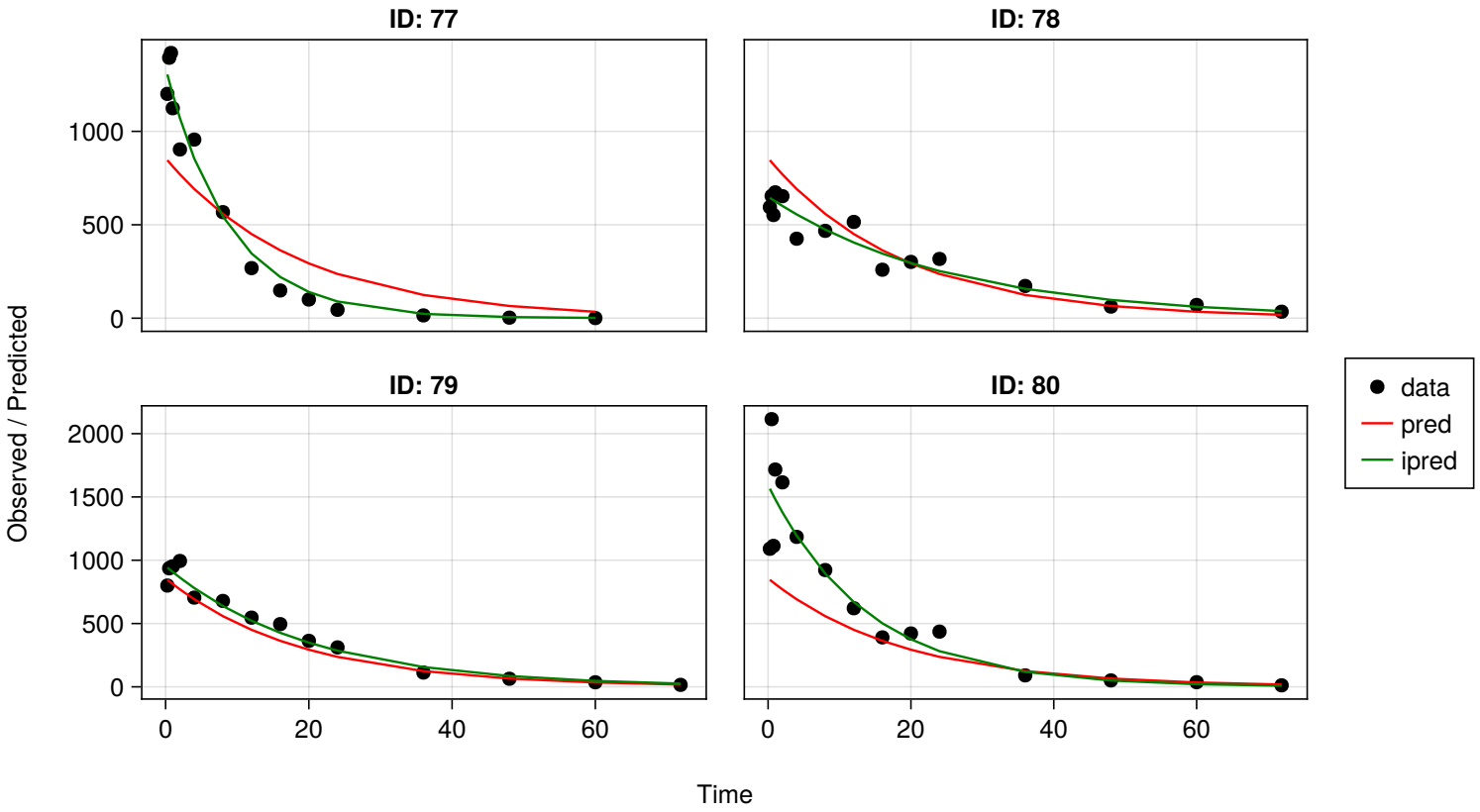

Figure 22: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (20 of 30)

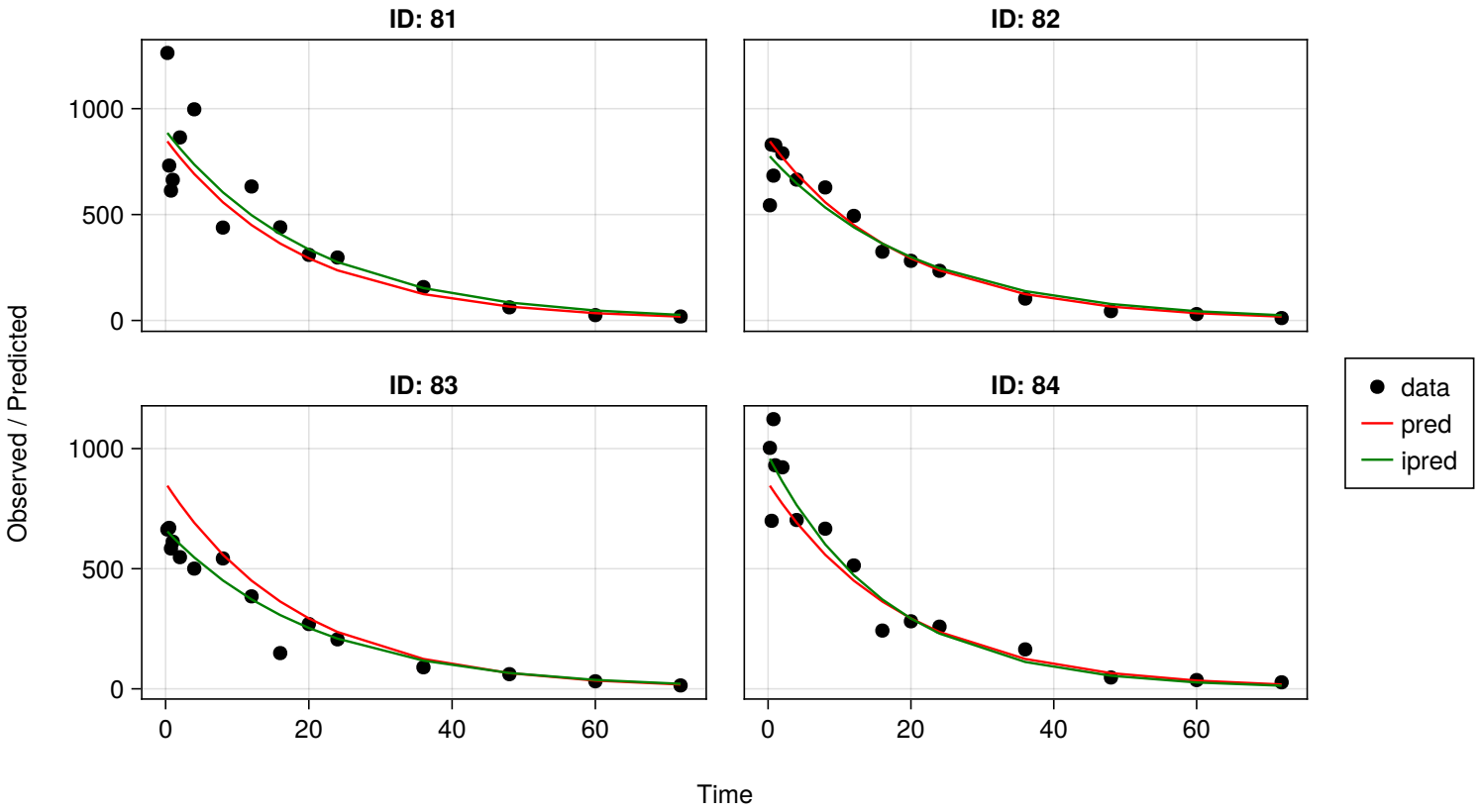

Figure 23: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (21 of 30)

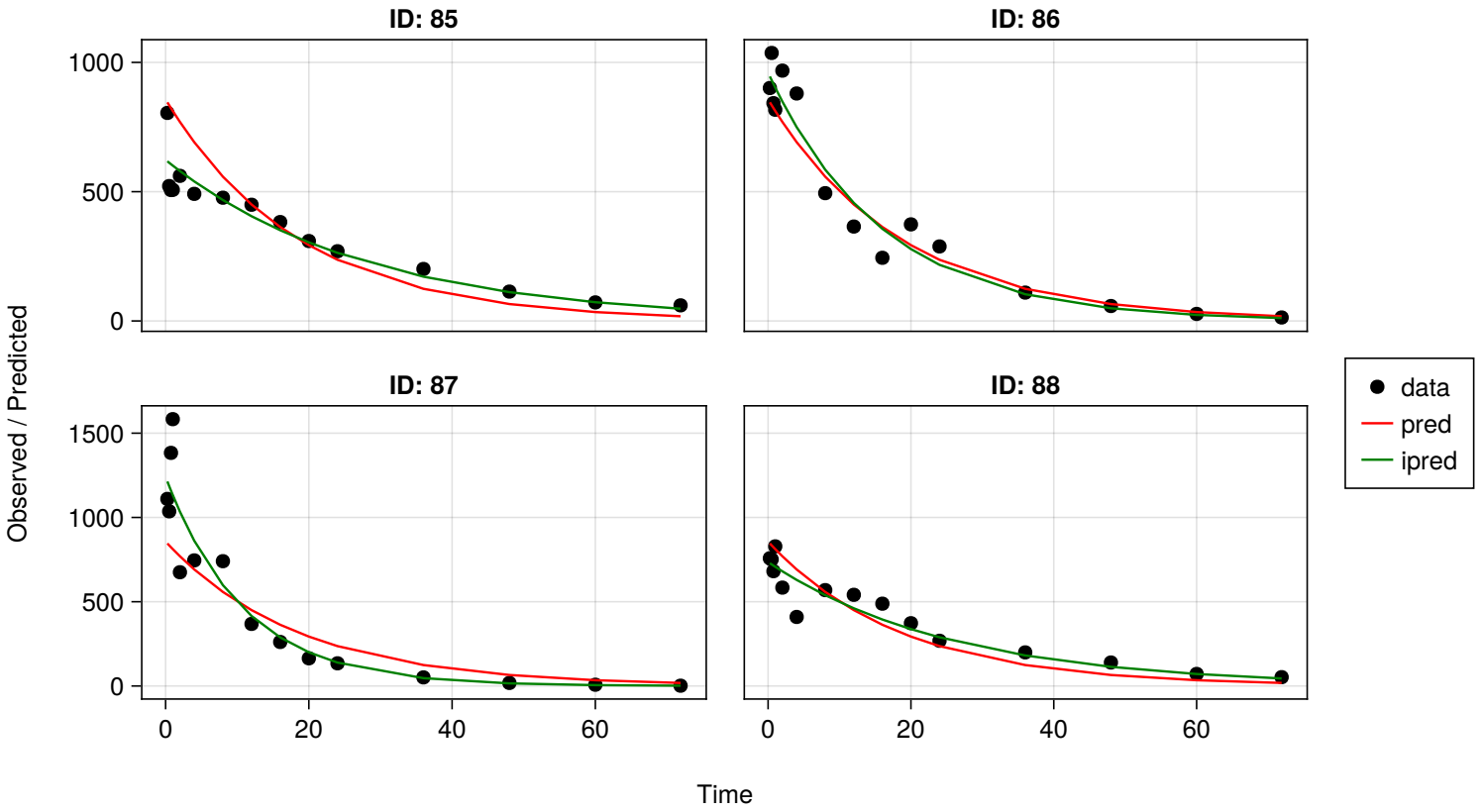

Figure 24: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (22 of 30)

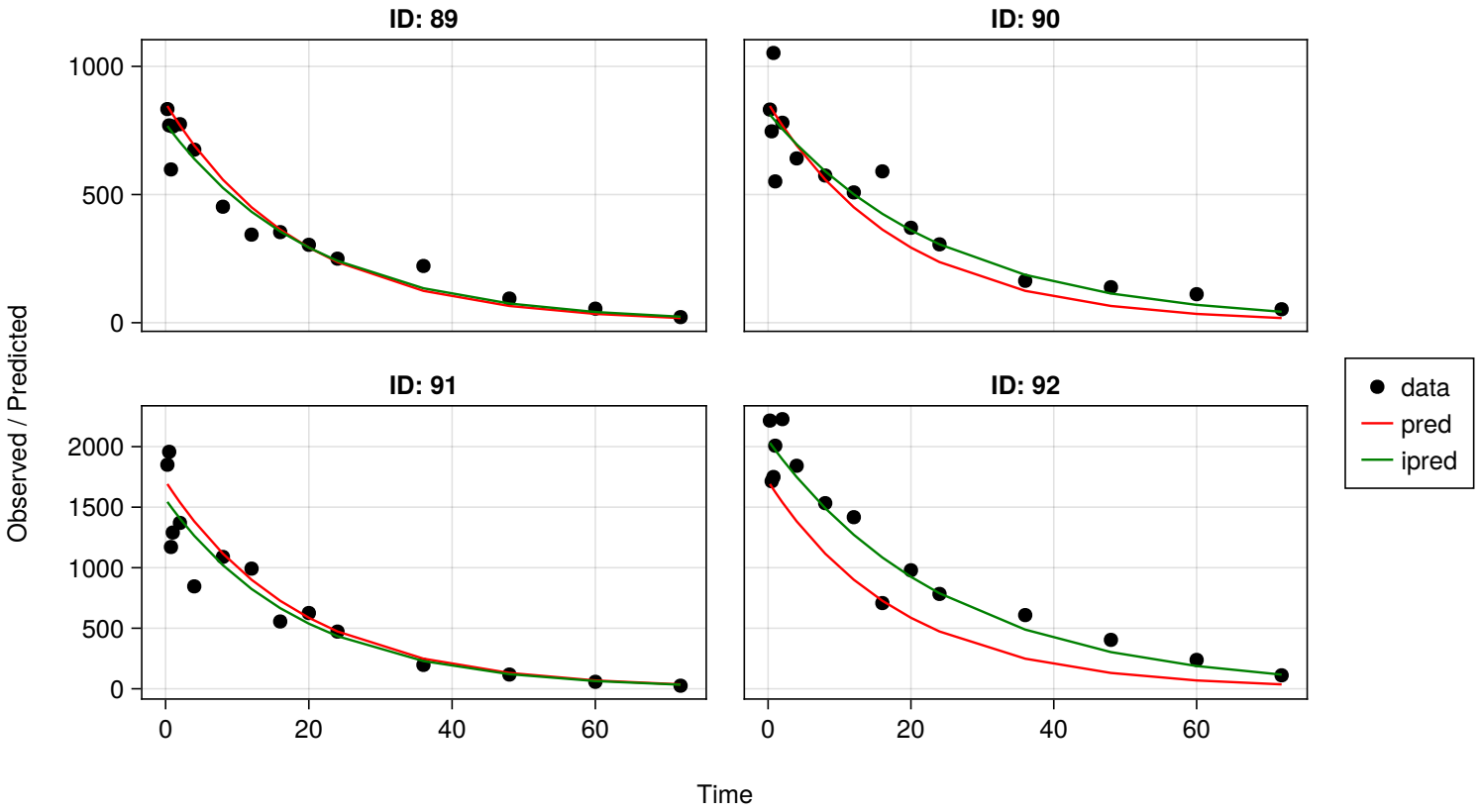

Figure 25: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (23 of 30)

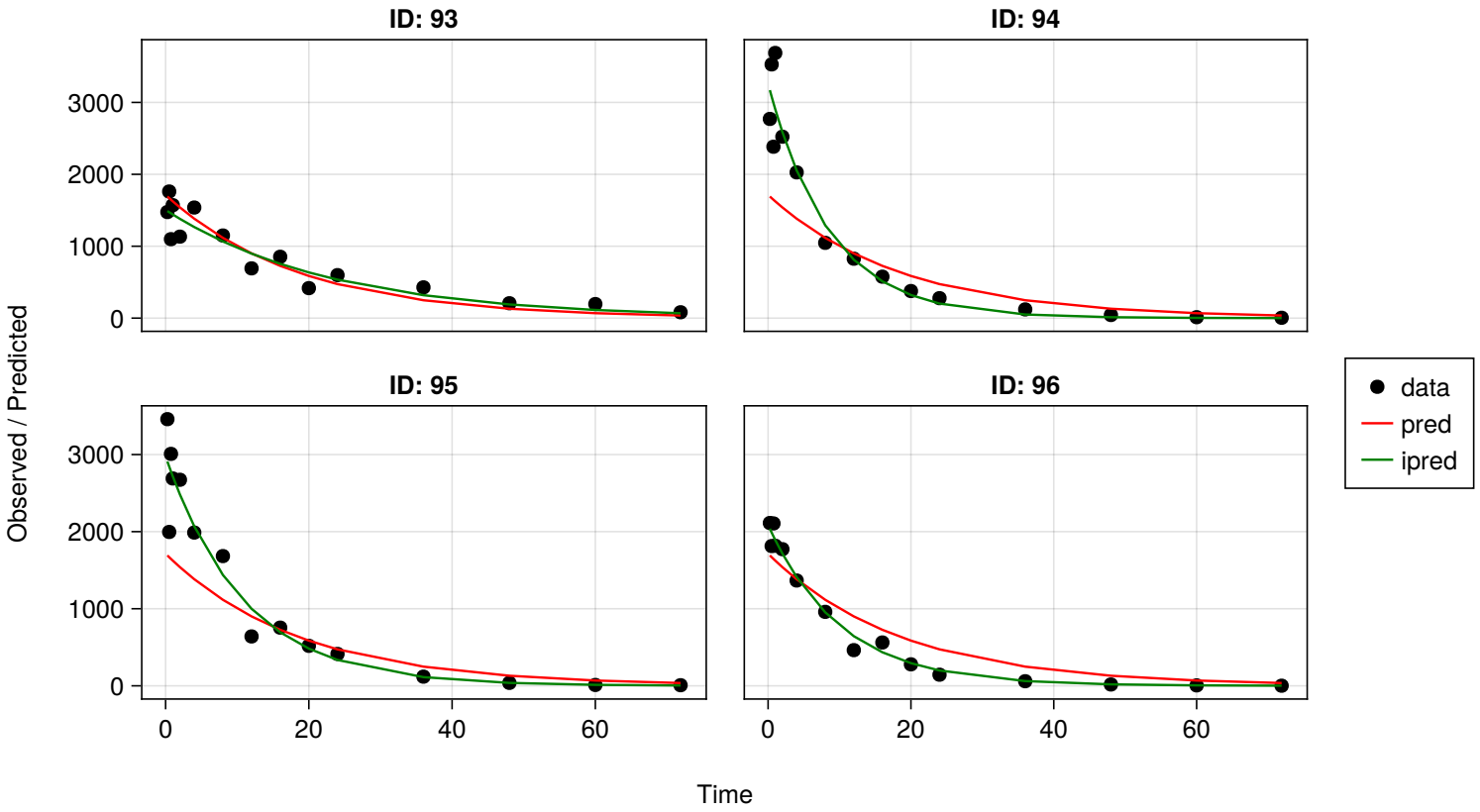

Figure 26: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (24 of 30)

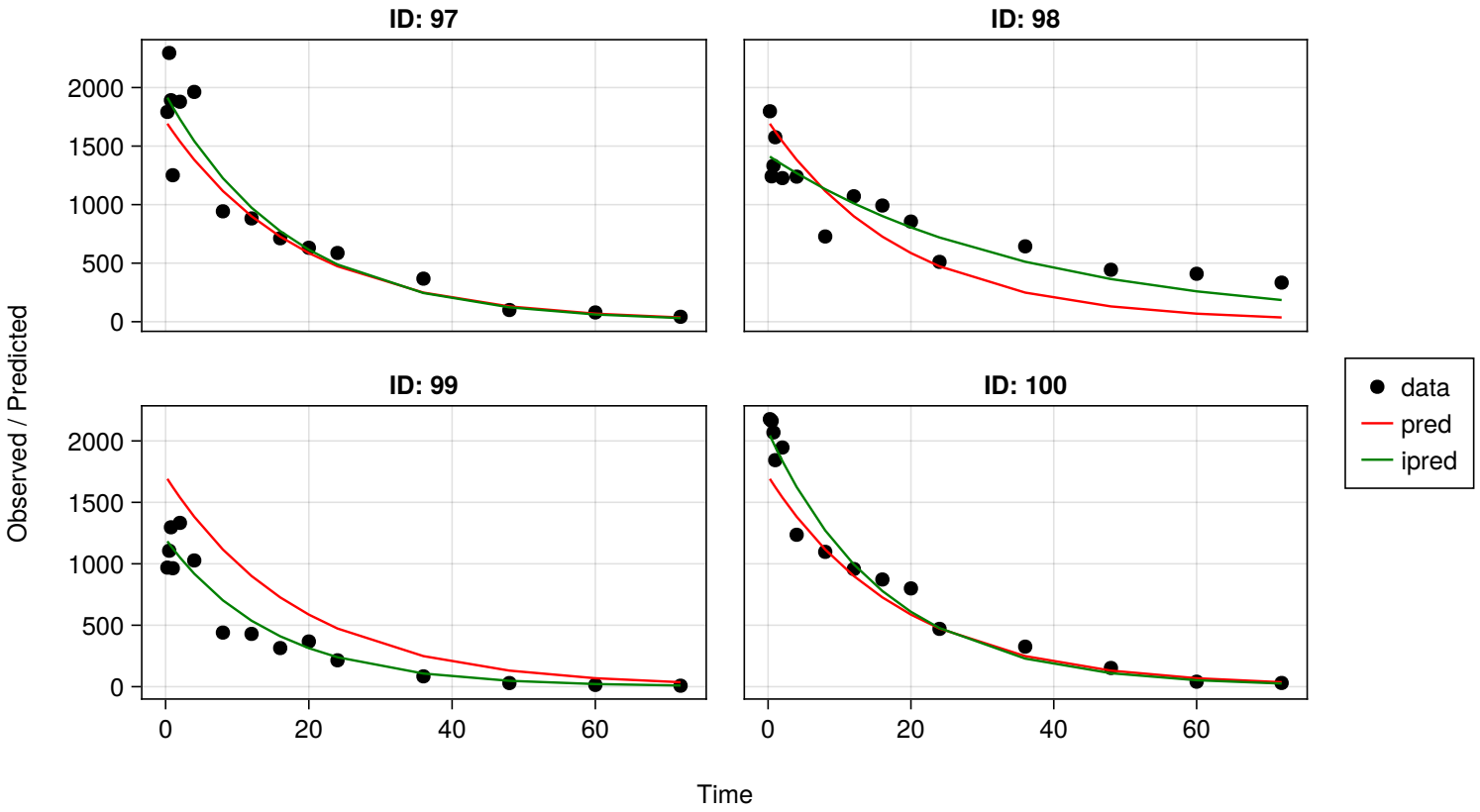

Figure 27: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (25 of 30)

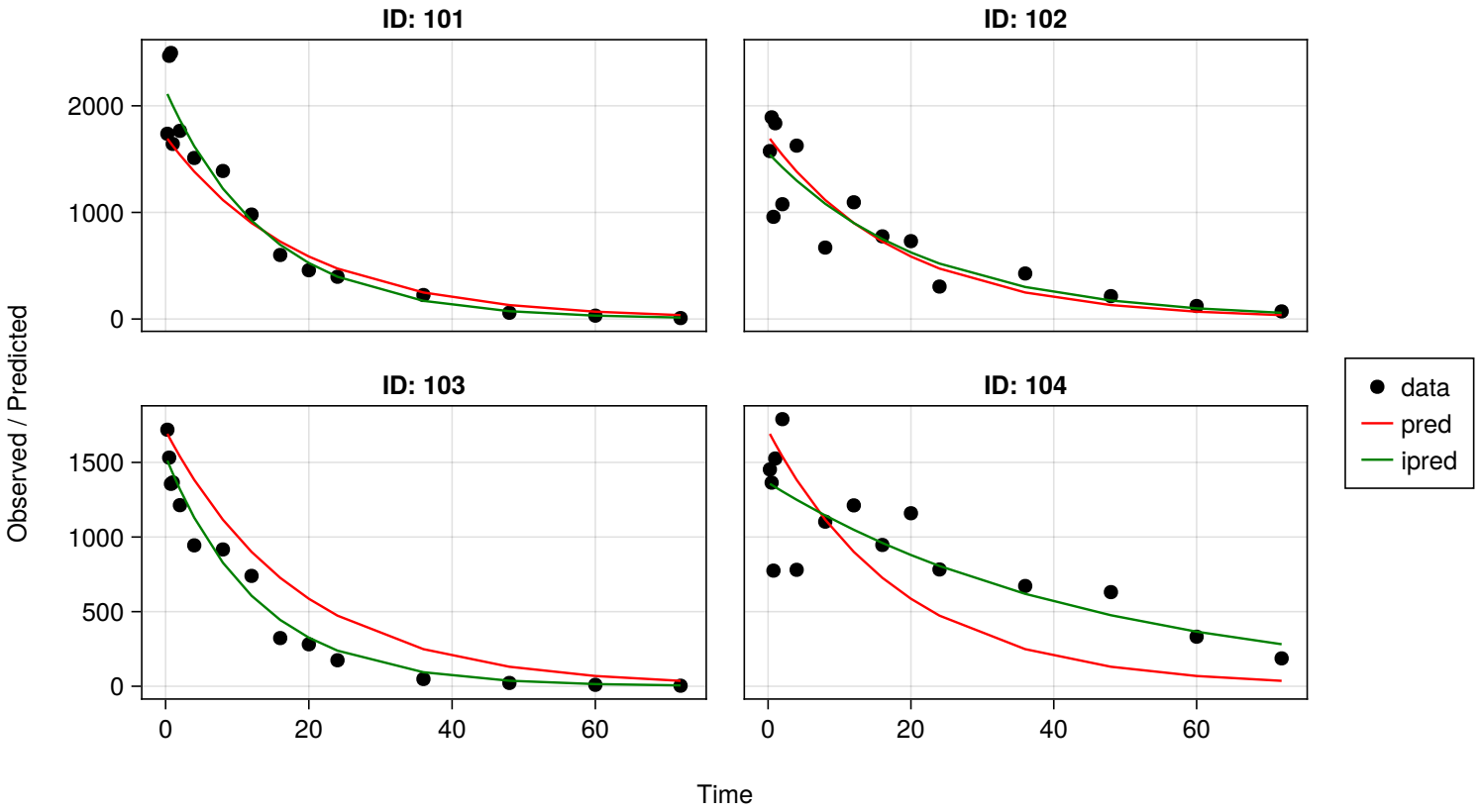

Figure 28: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (26 of 30)

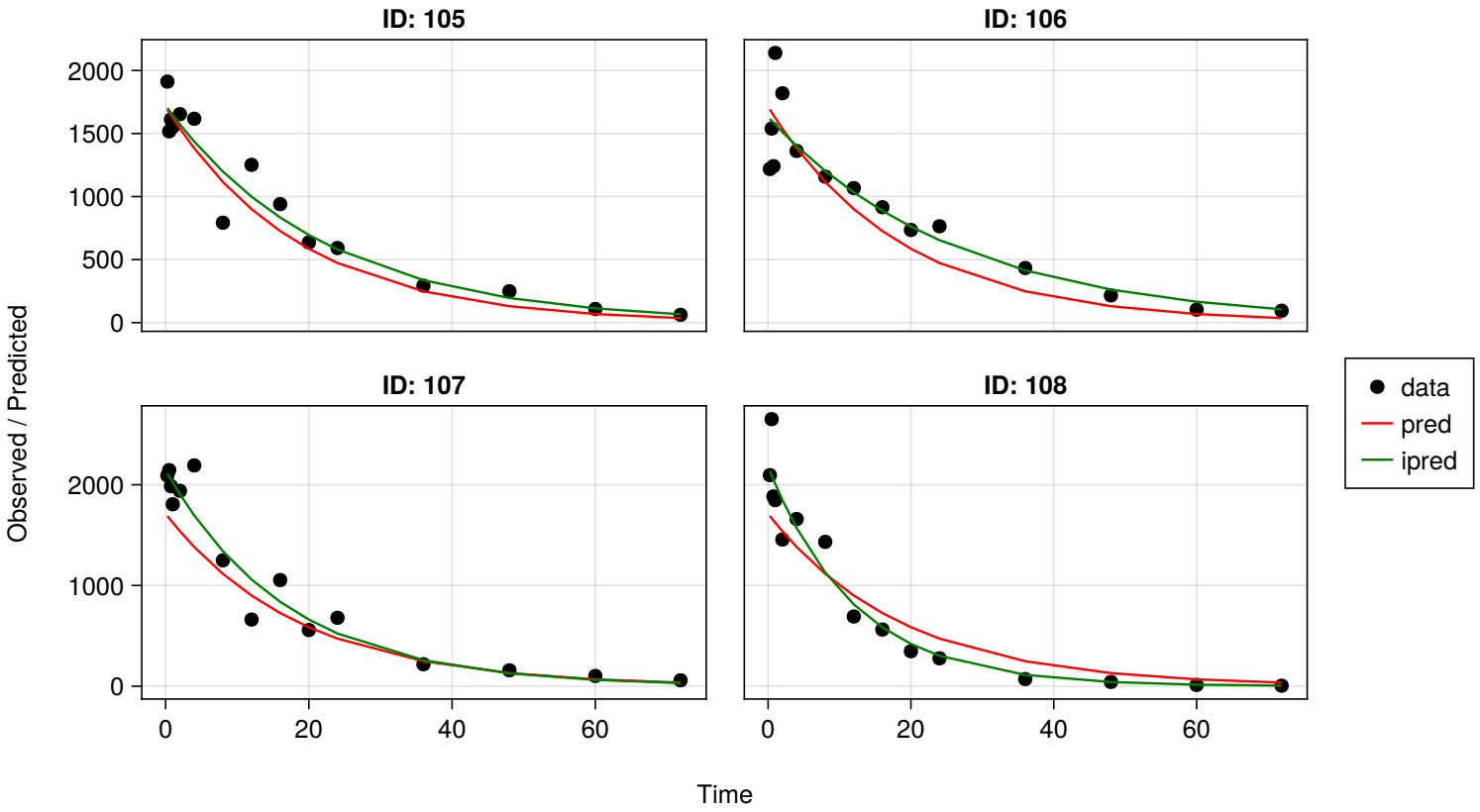

Figure 29: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (27 of 30)

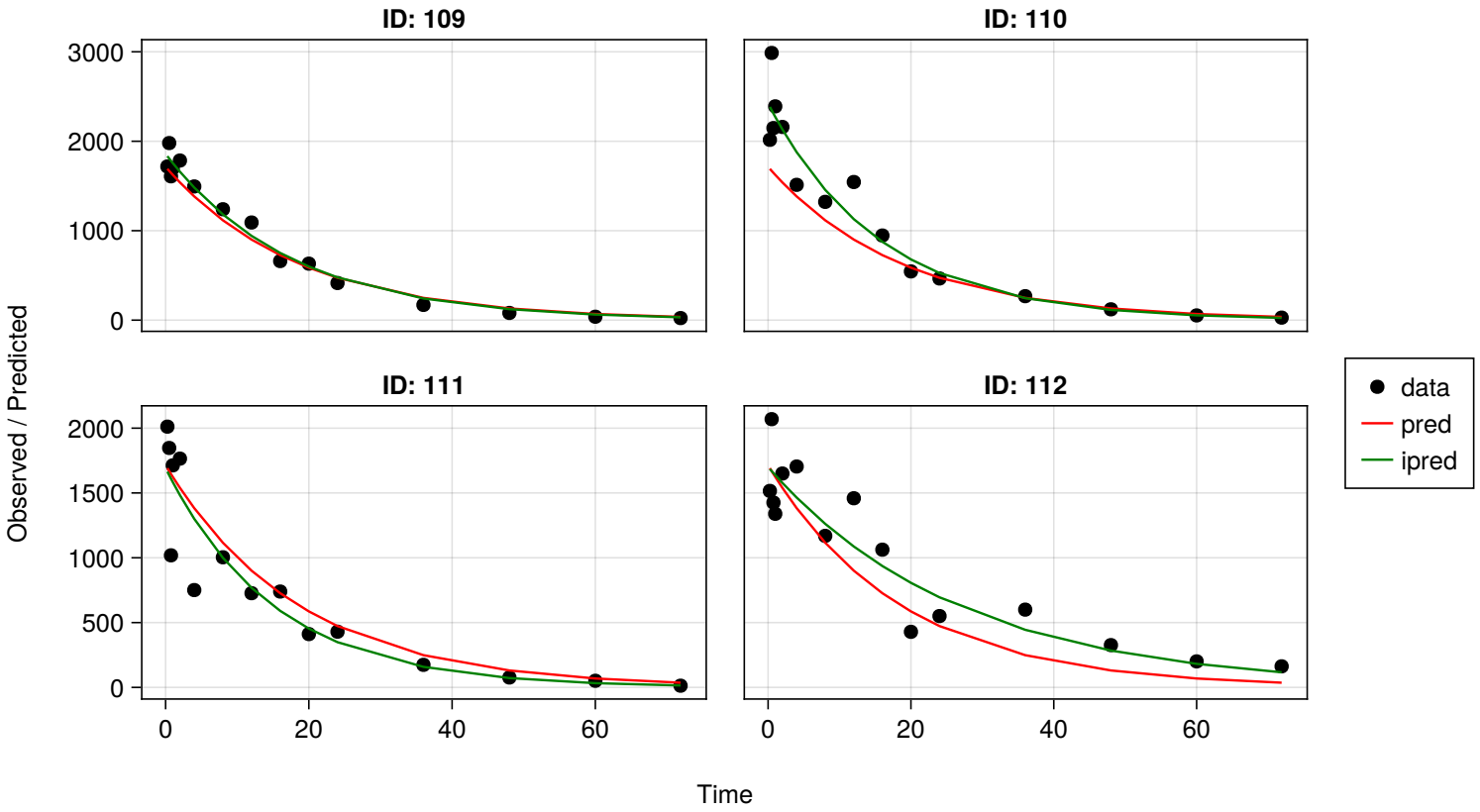

Figure 30: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (28 of 30)

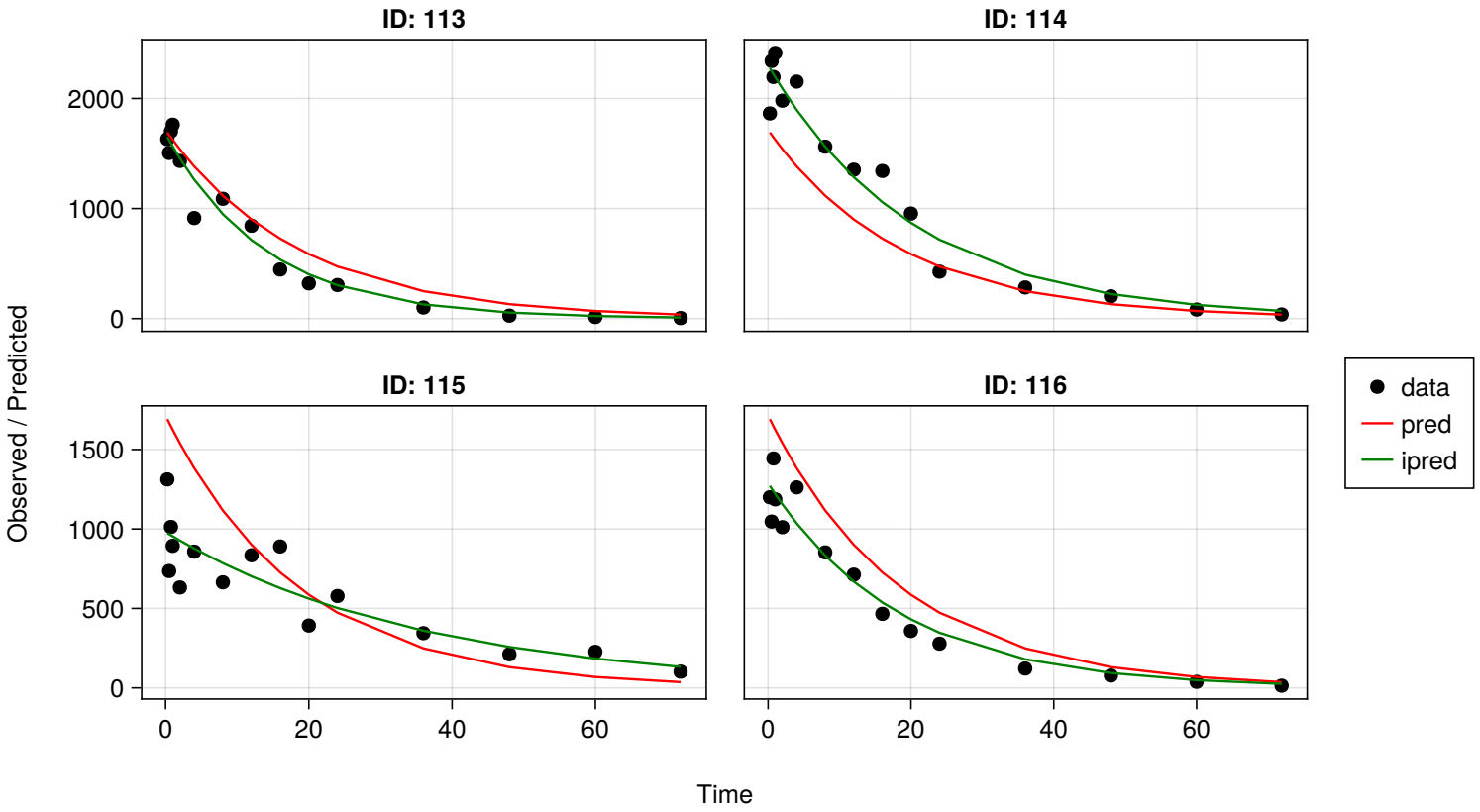

Figure 31: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (29 of 30)

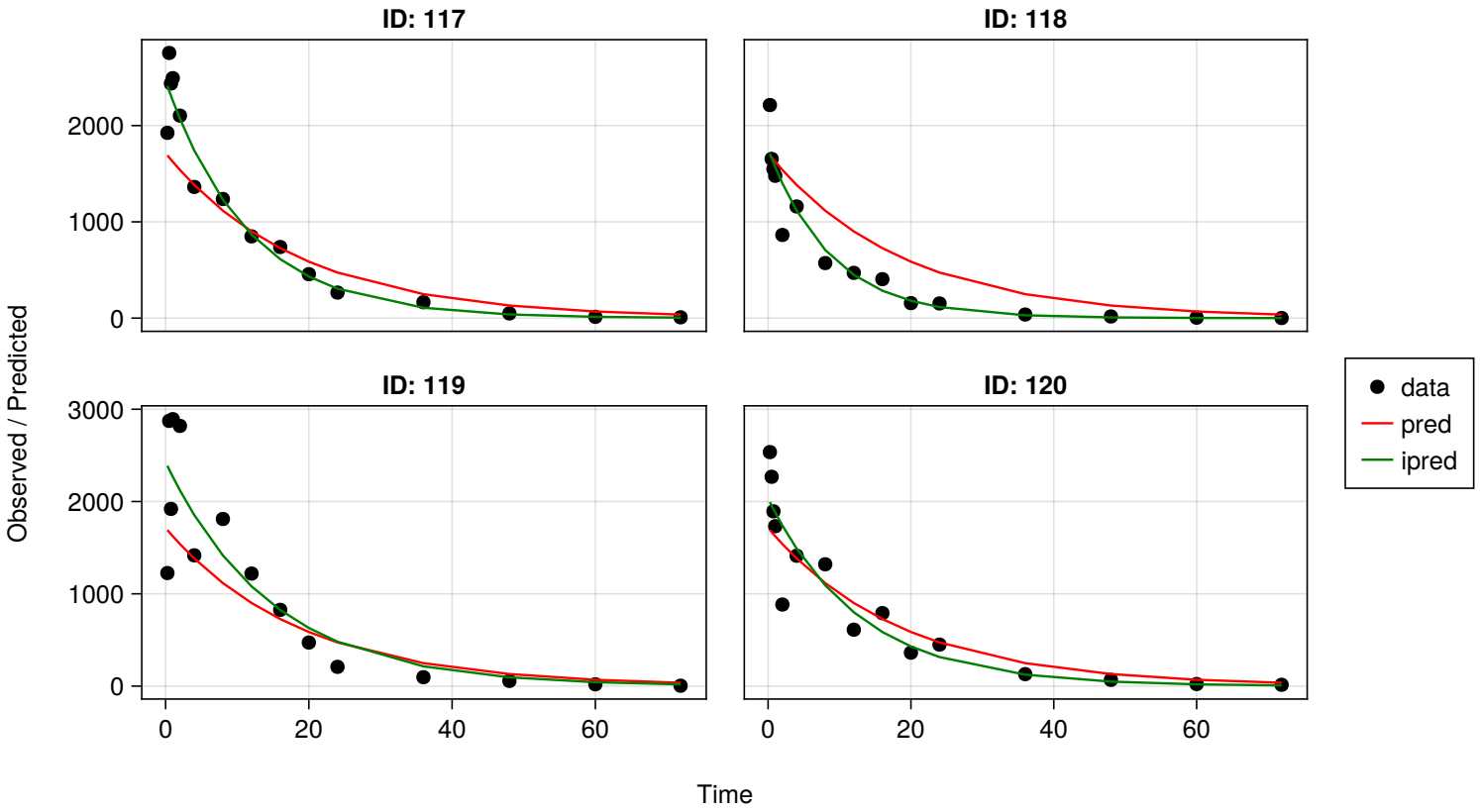

Figure 32: FOCE: Population and individual predictions overlaid over observations for Observed (dv) by ID (30 of 30)

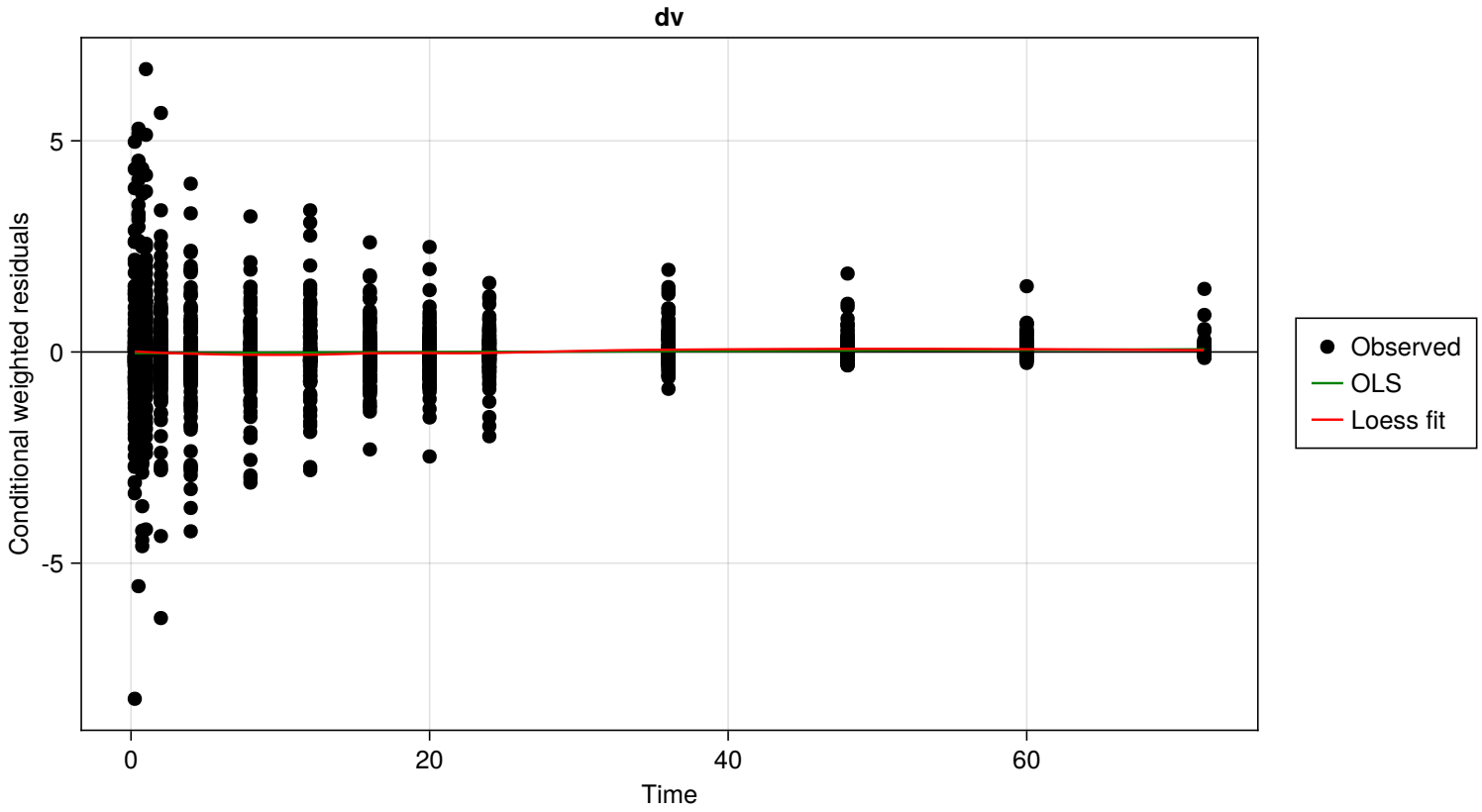

Figure 33: FOCE: Conditional weighted residuals Observed (dv) vs Time (1 of 1)

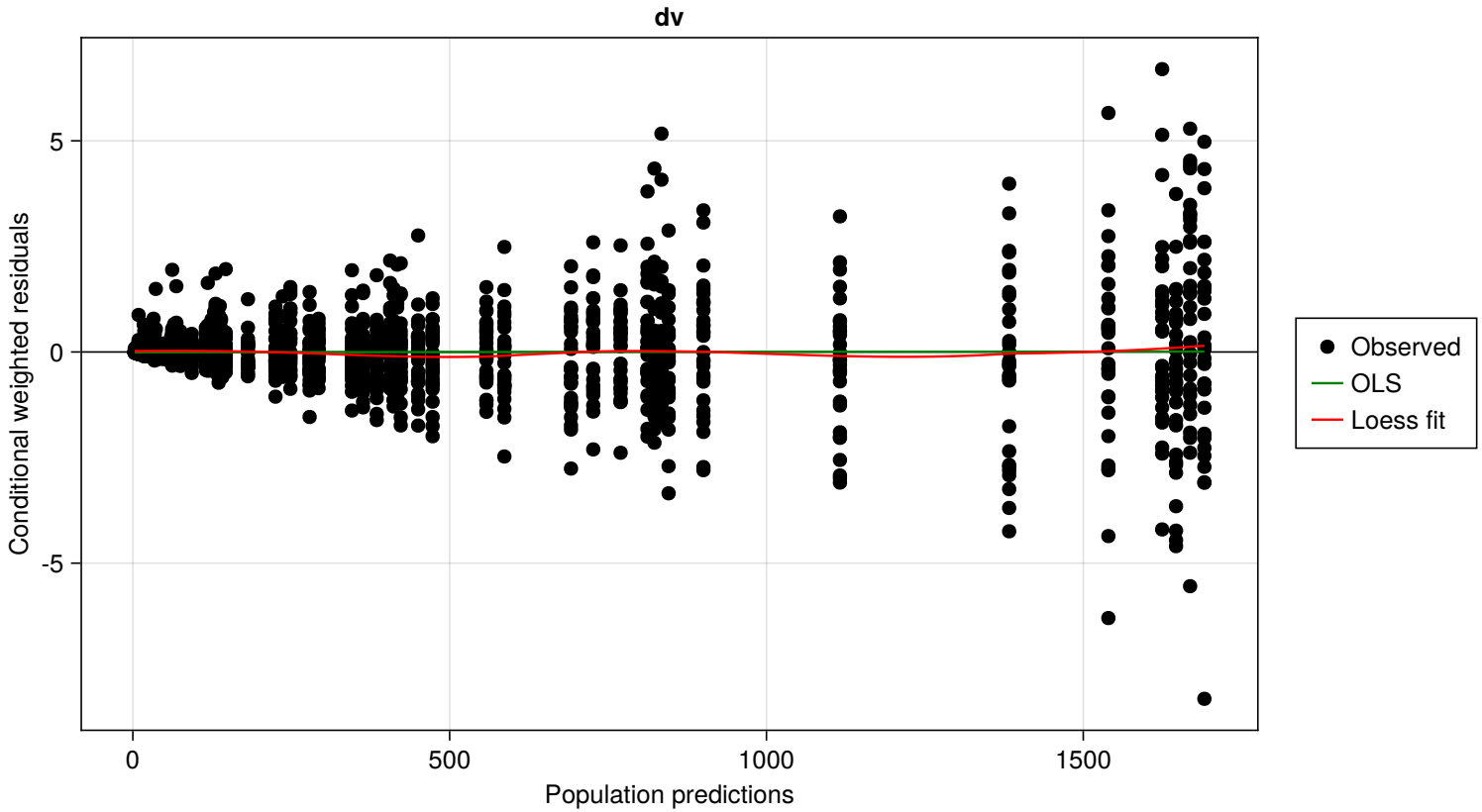

Figure 34: FOCE: Conditional weighted residuals Observed (dv) vs predictions (1 of 1)

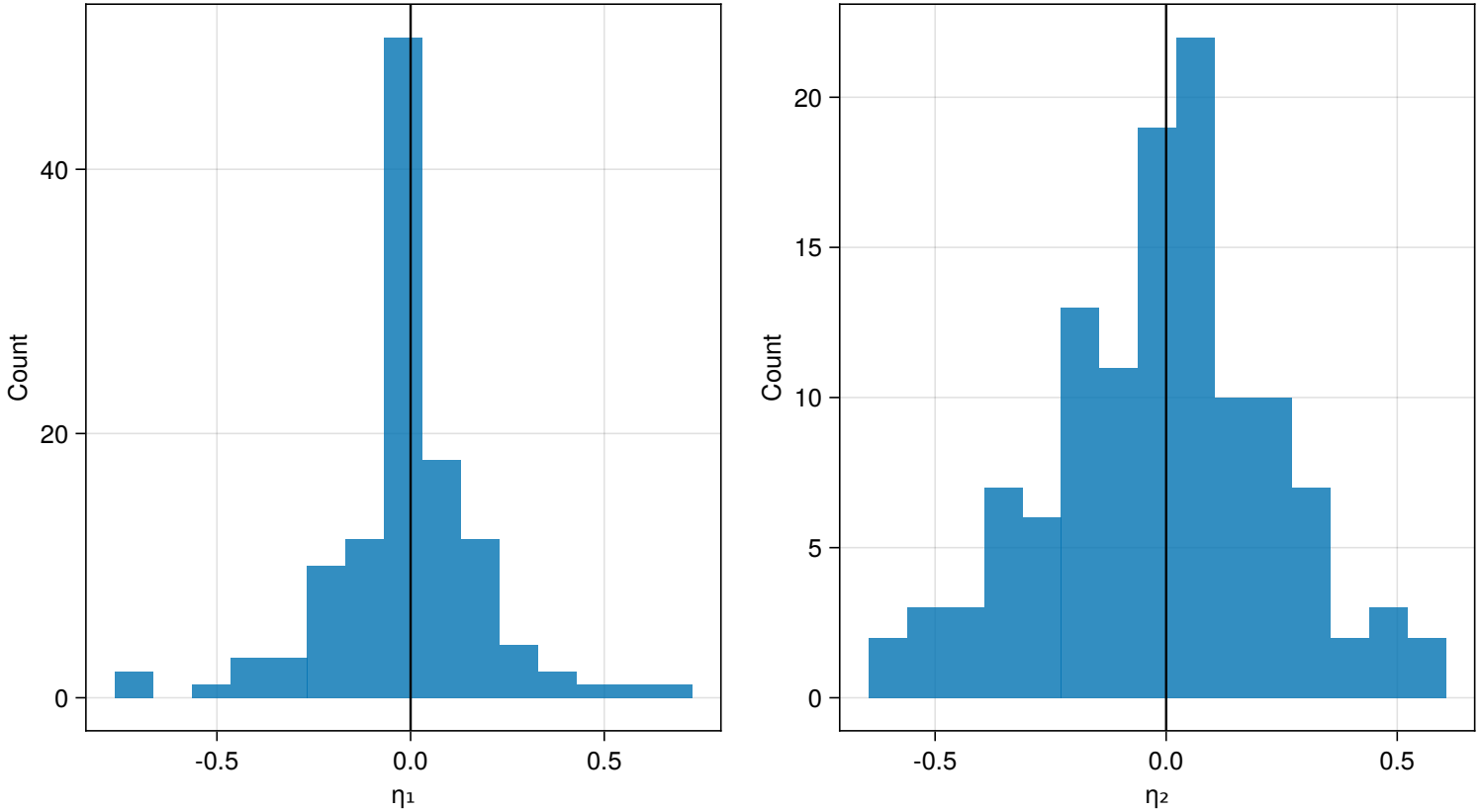

Figure 35: FOCE: Distribution of random effects (1 of 1)

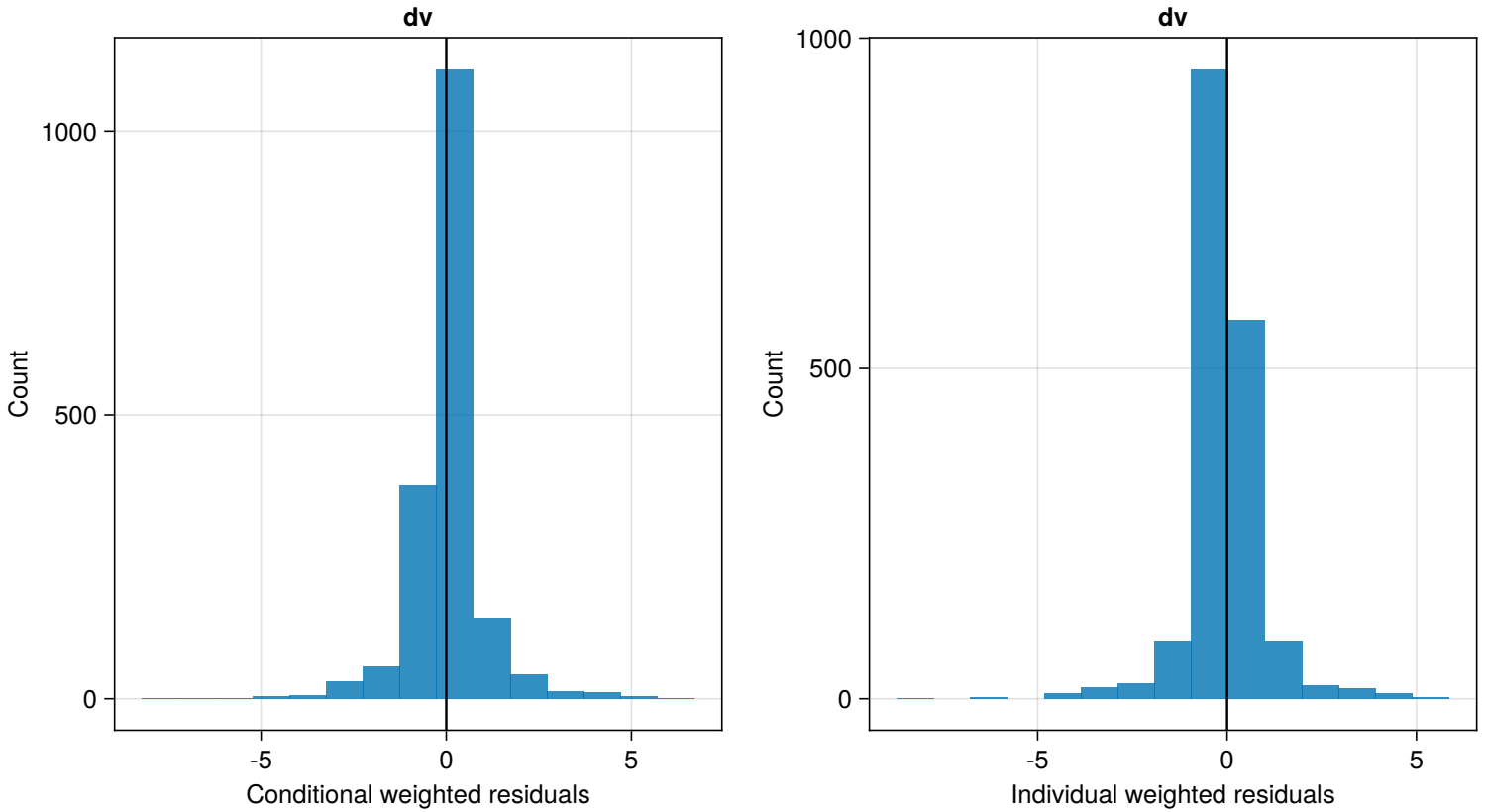

Figure 36: FOCE: Distribution of weighted residuals Observed (dv) (1 of 1)

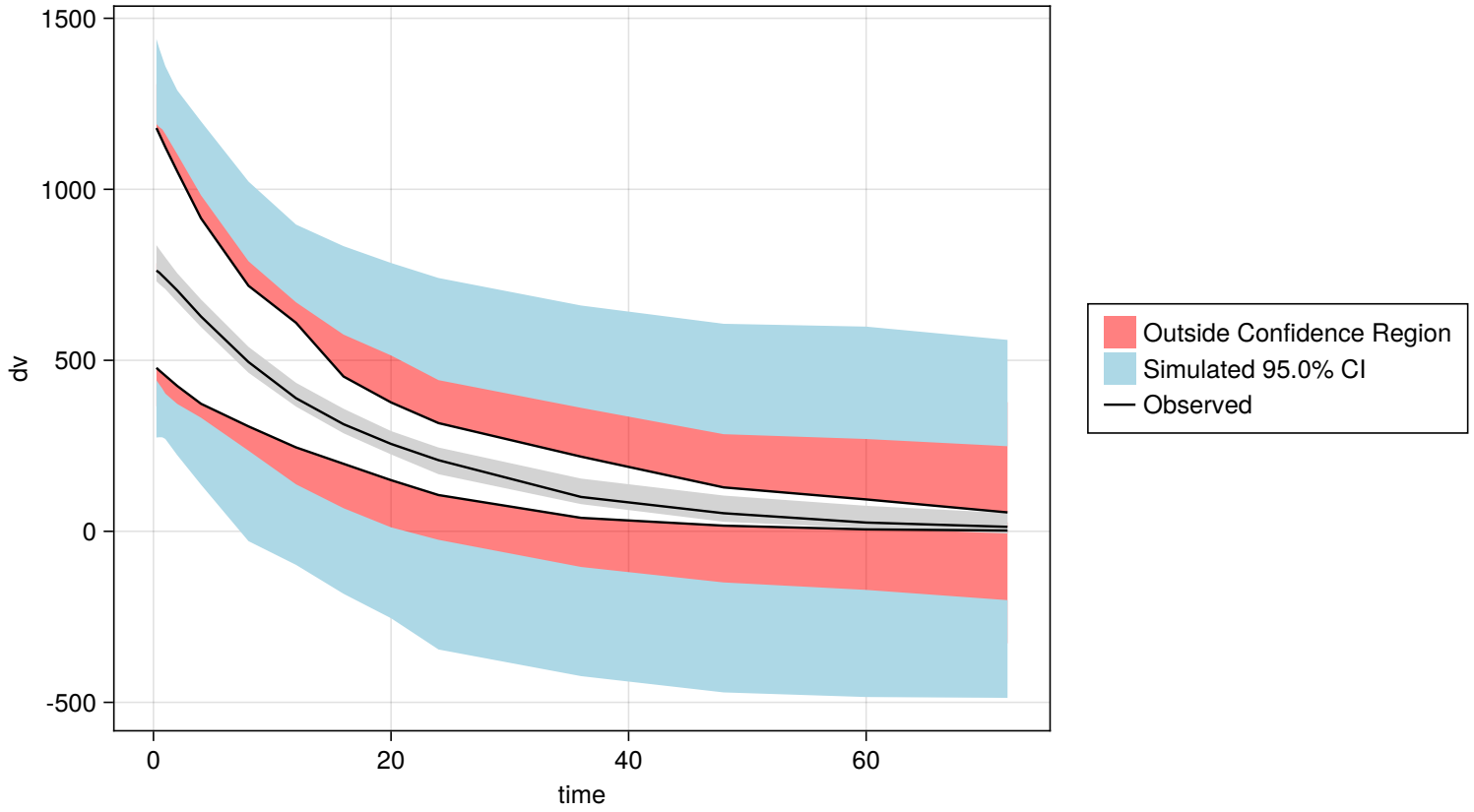

Figure 37: FOCE: Visual predictive checks 1 (1 of 1)

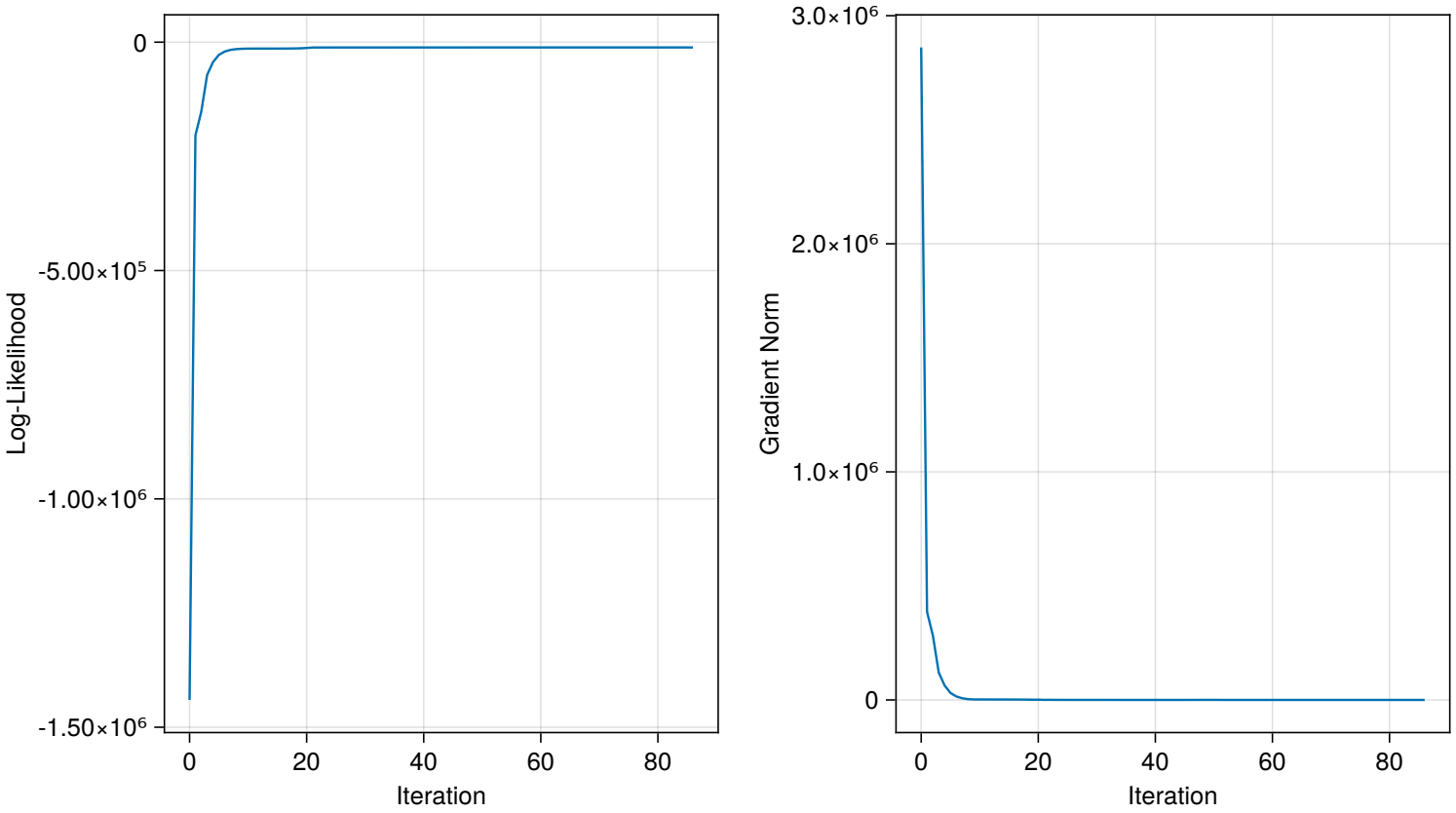

Figure 38: FOCE: Traceplot of loglikelihood and gradient norm (1 of 1)

6.2 FOCE_constantcoef

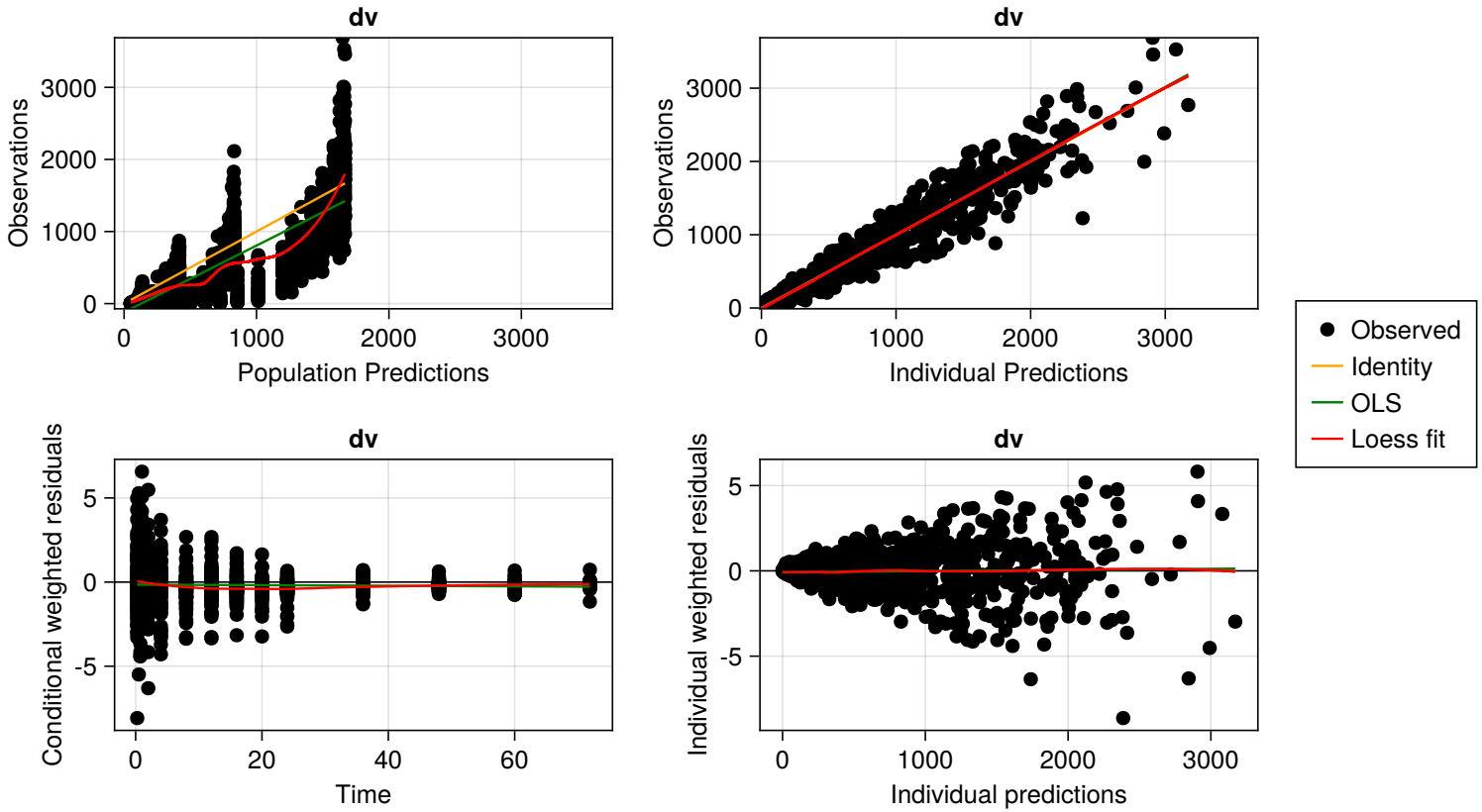

Figure 39: FOCE_constantcoef: Goodness of fit plots showcasing observations (dv) versus population and individual predictions (top panel) and, weighted residuals (dv) vs population predictions and individual weighted residuals vs time (bottom panel) (1 of 1)

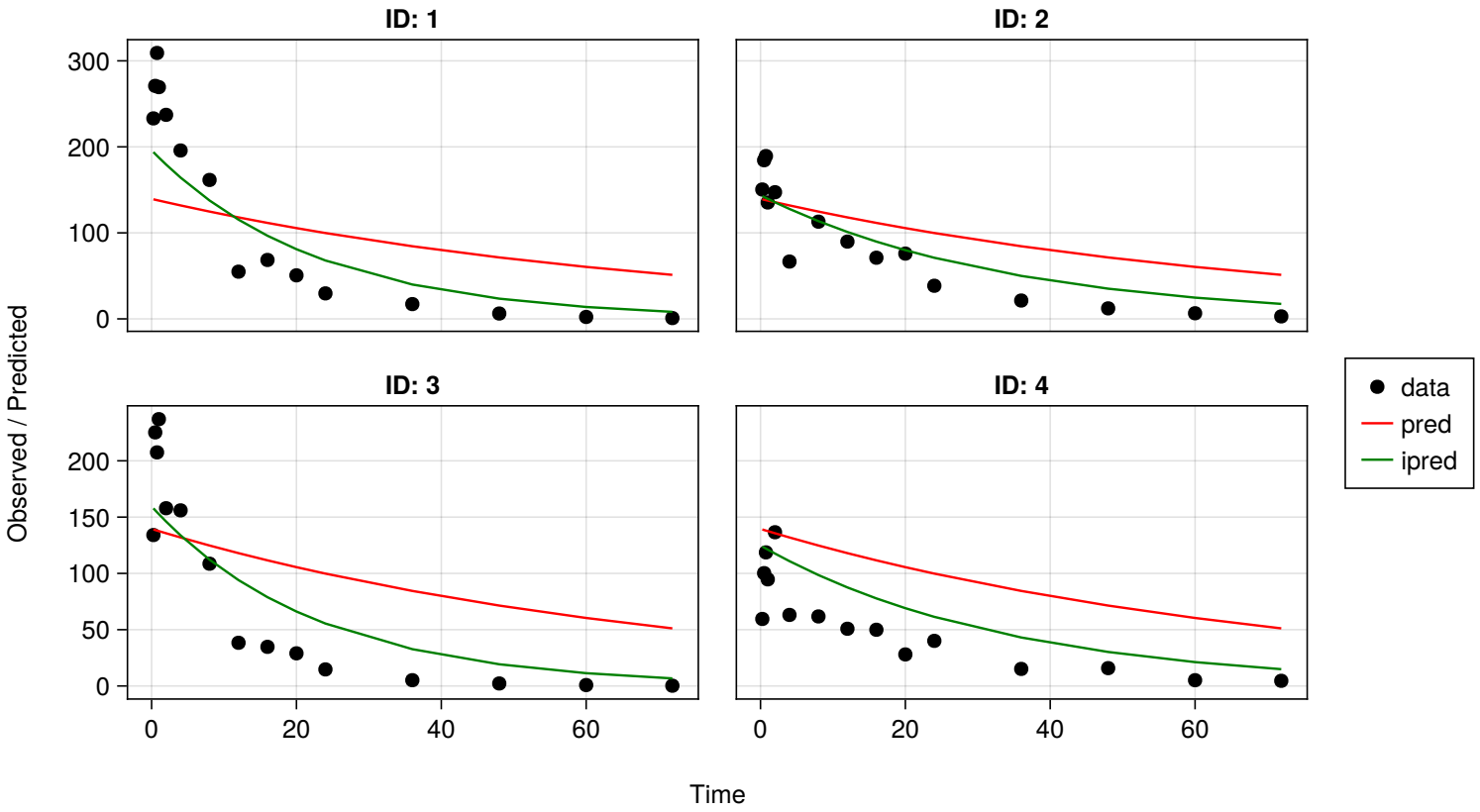

Figure 40: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (1 of 30)

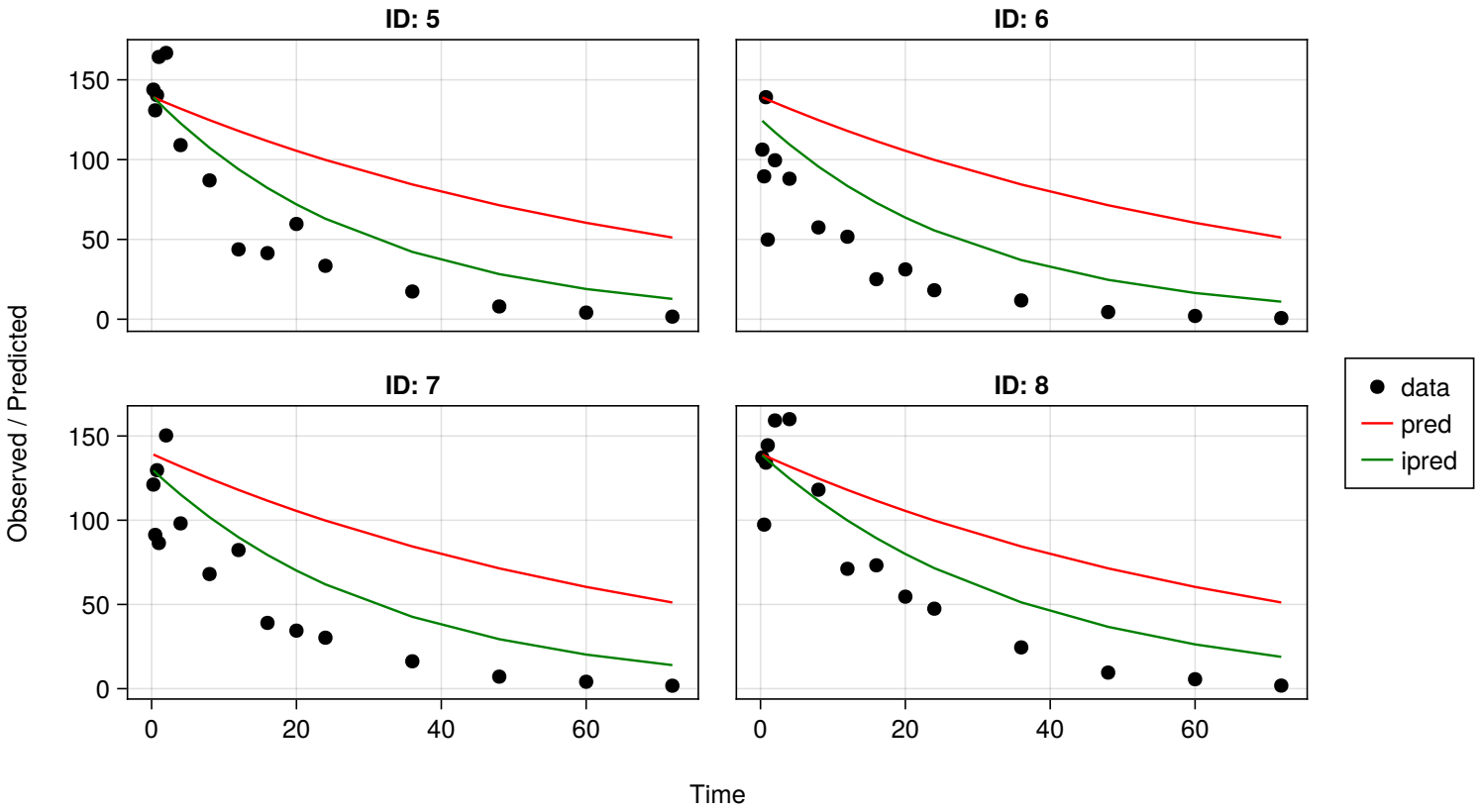

Figure 41: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (2 of 30)

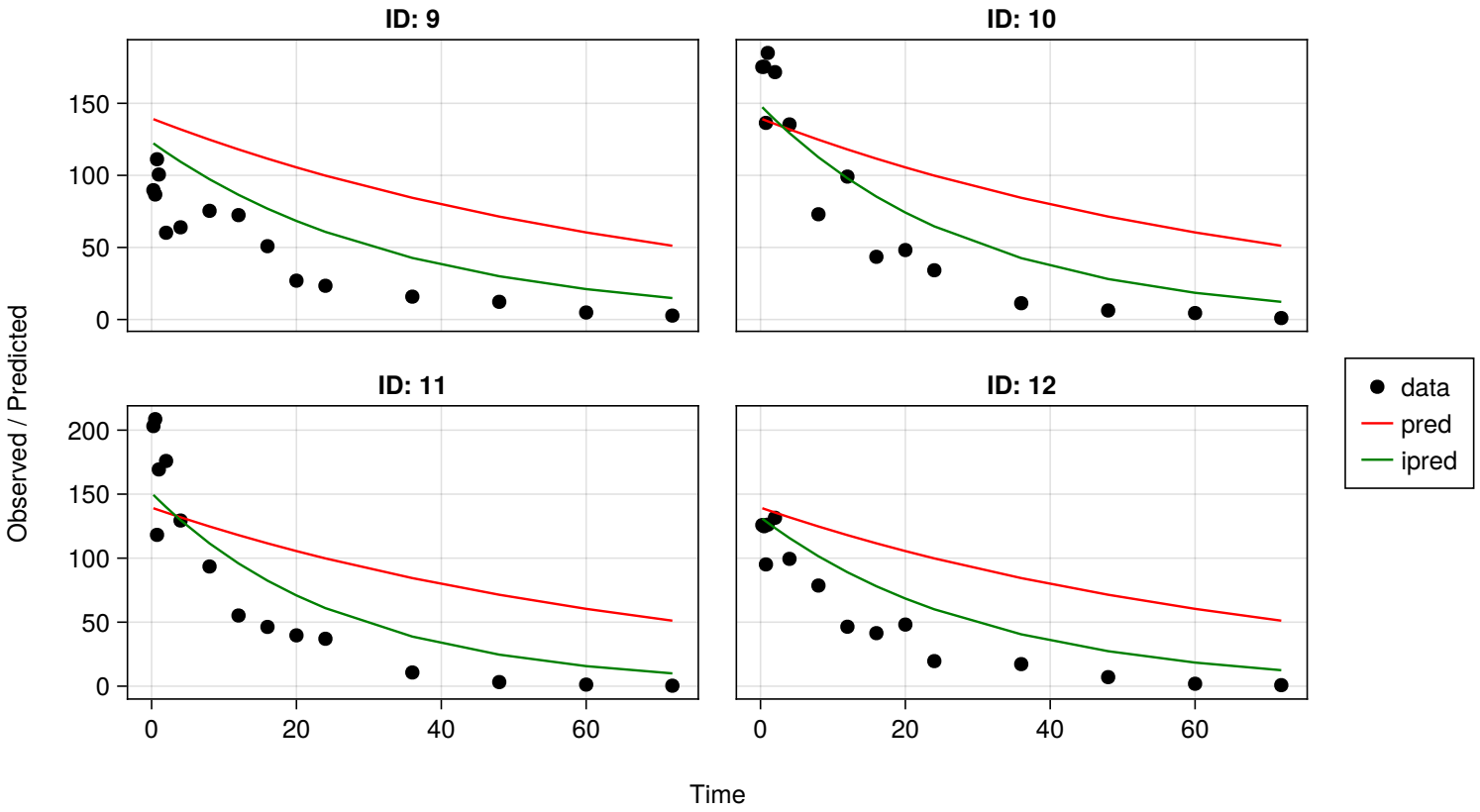

Figure 42: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (3 of 30)

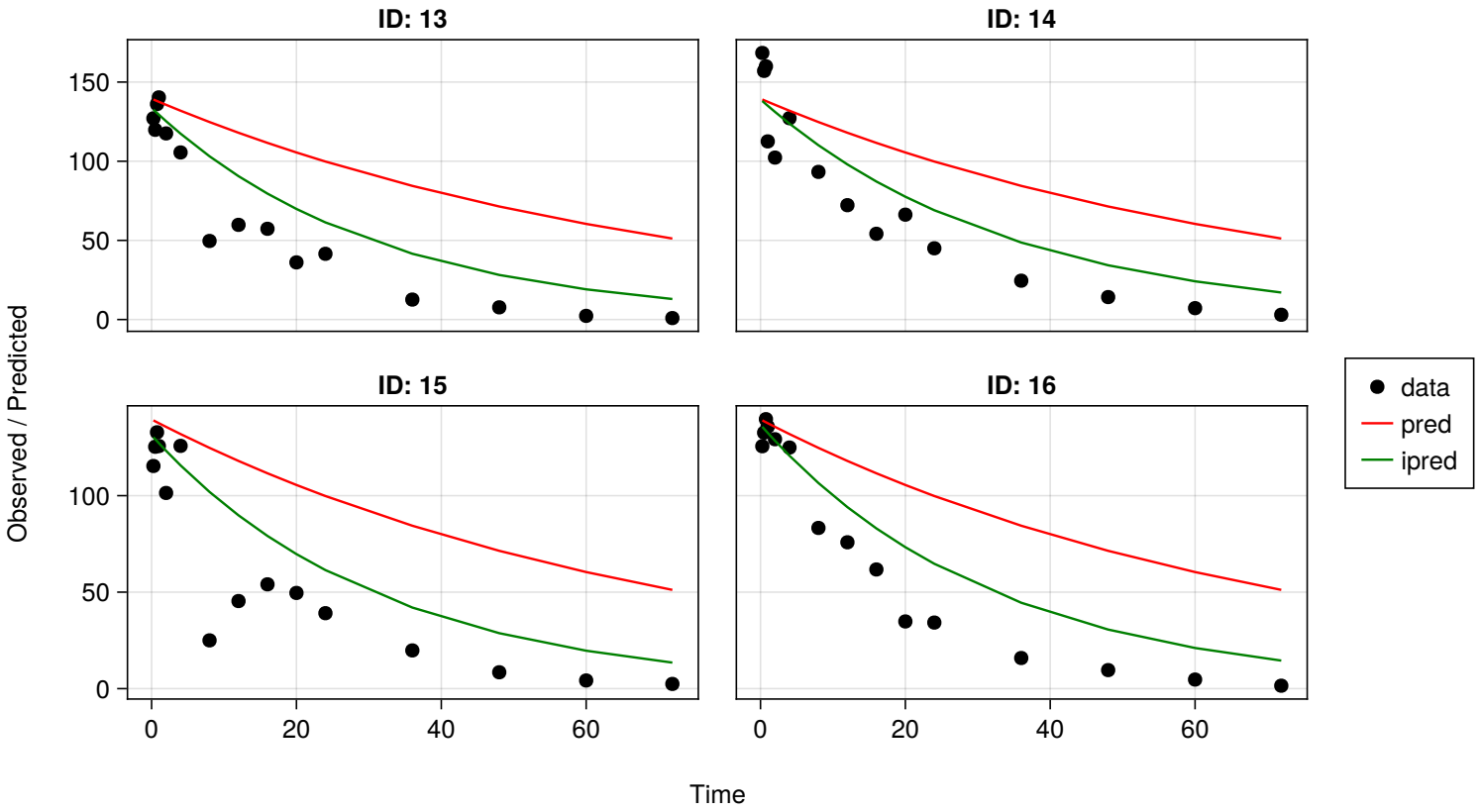

Figure 43: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (4 of 30)

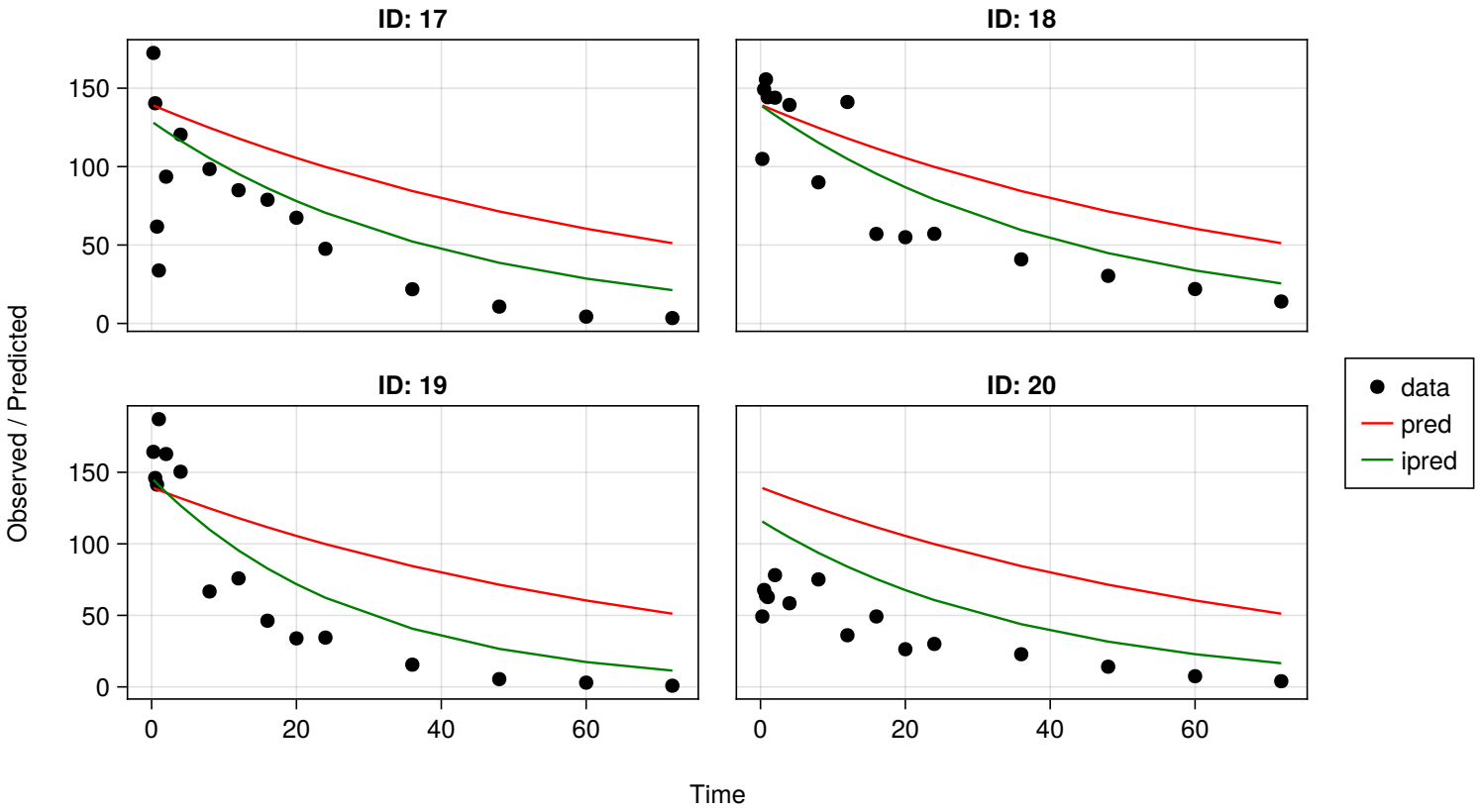

Figure 44: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (5 of 30)

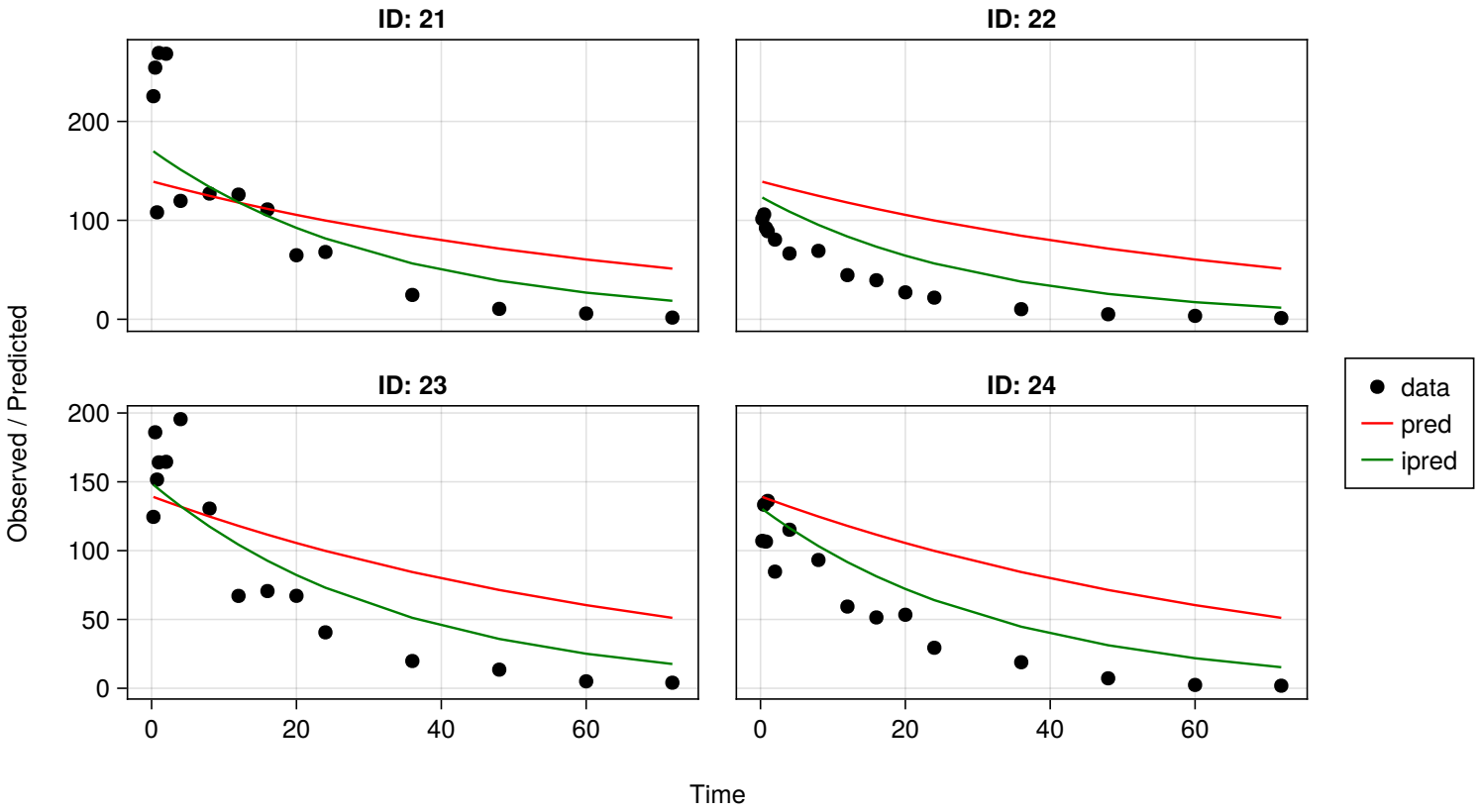

Figure 45: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (6 of 30)

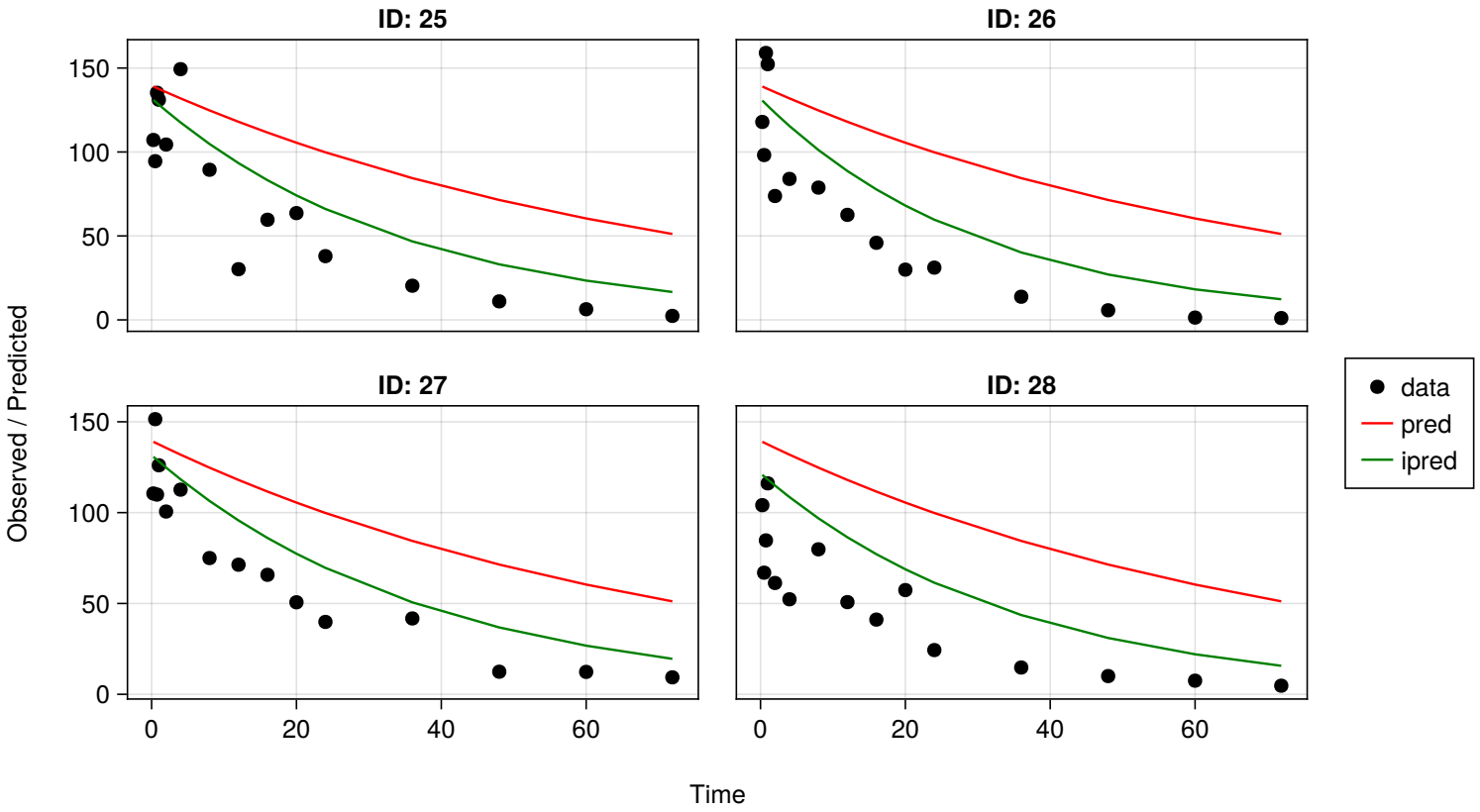

Figure 46: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (7 of 30)

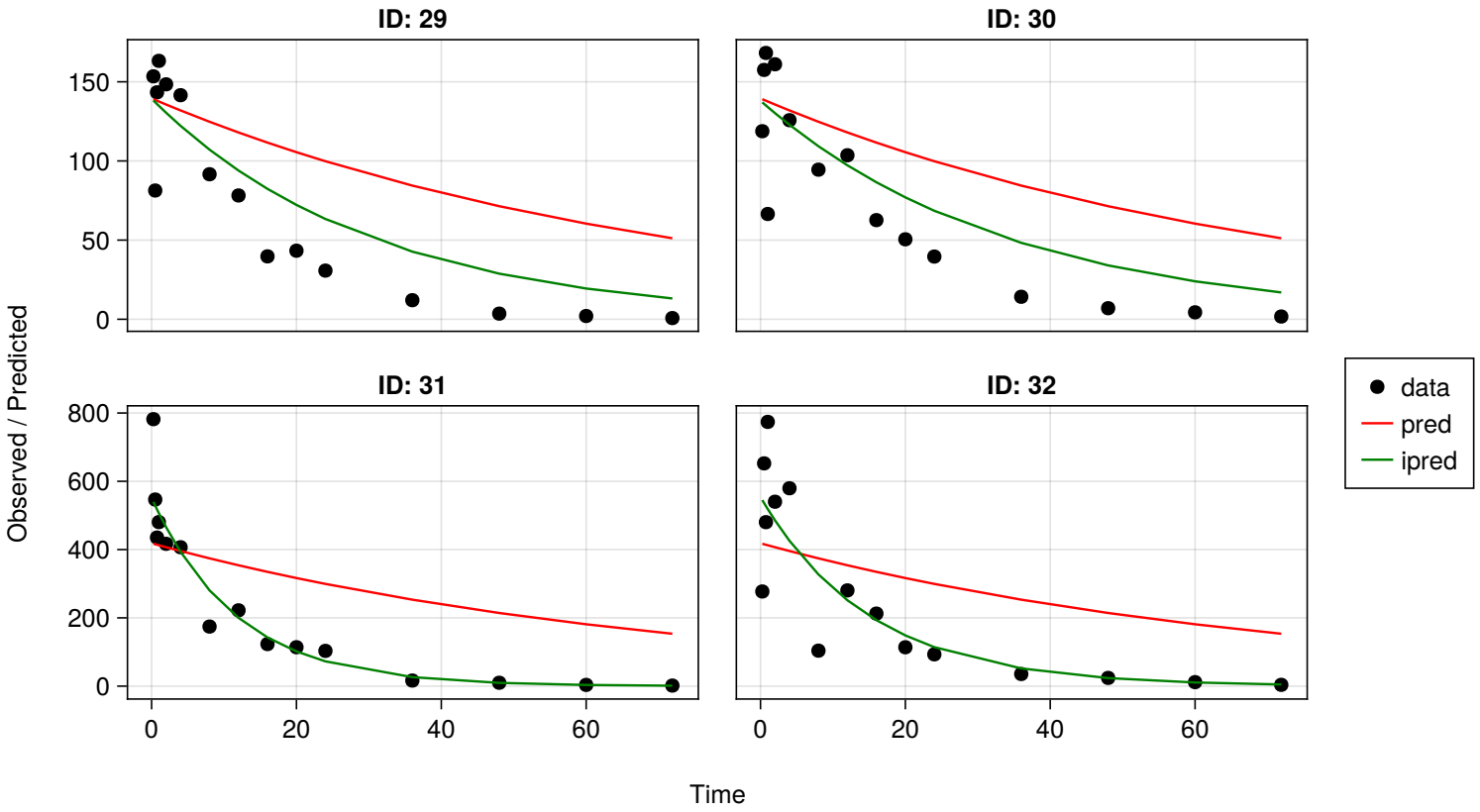

Figure 47: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (8 of 30)

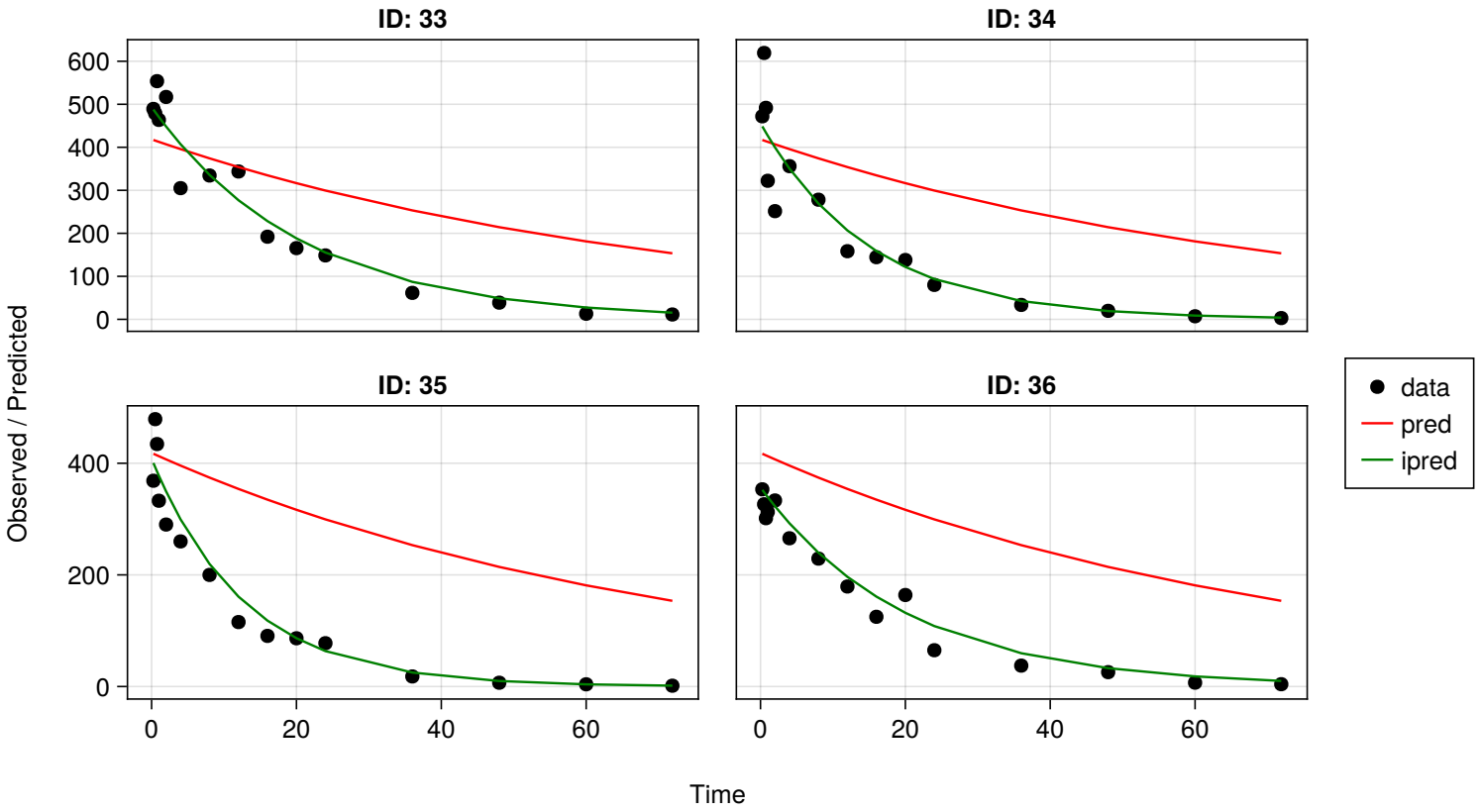

Figure 48: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (9 of 30)

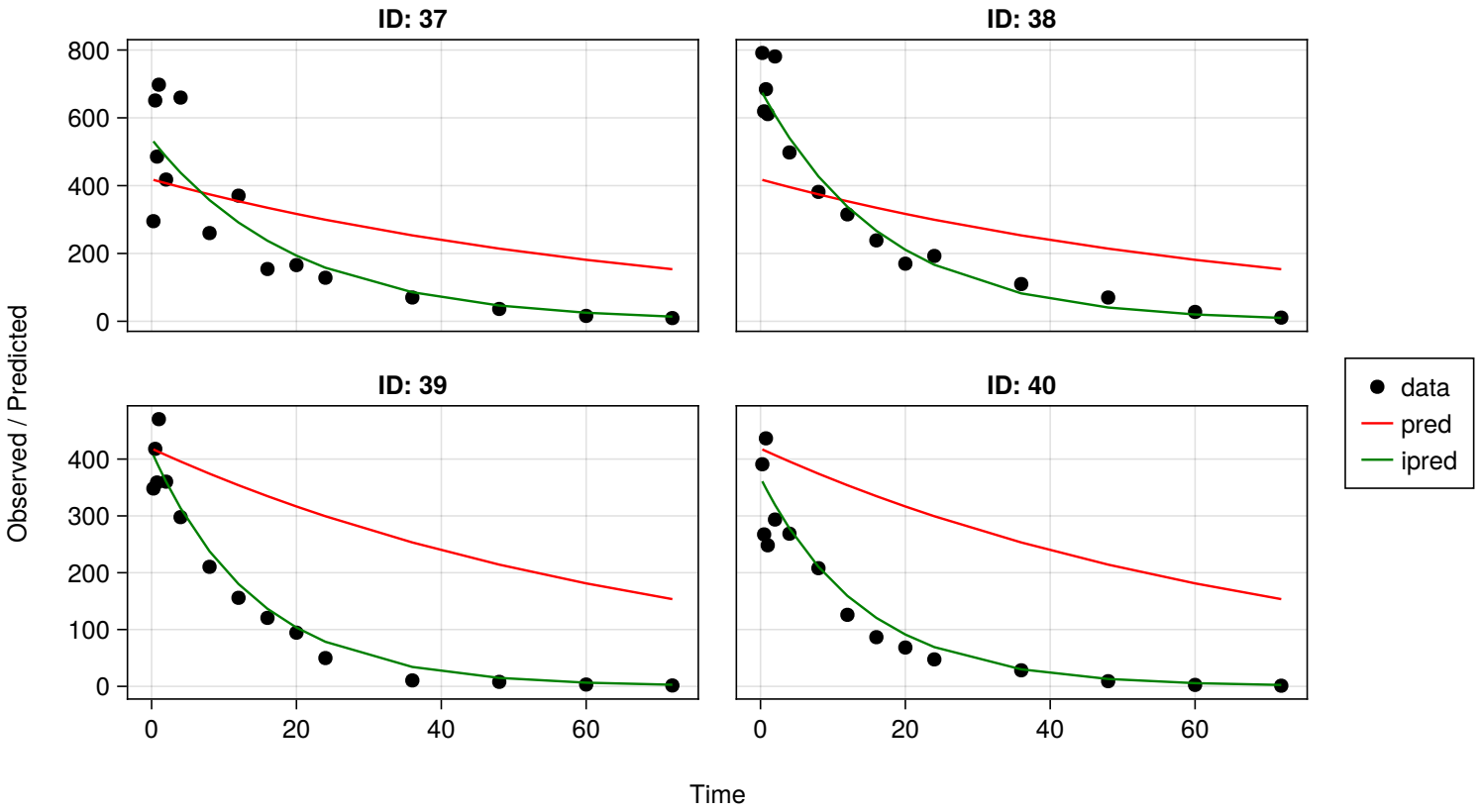

Figure 49: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (10 of 30)

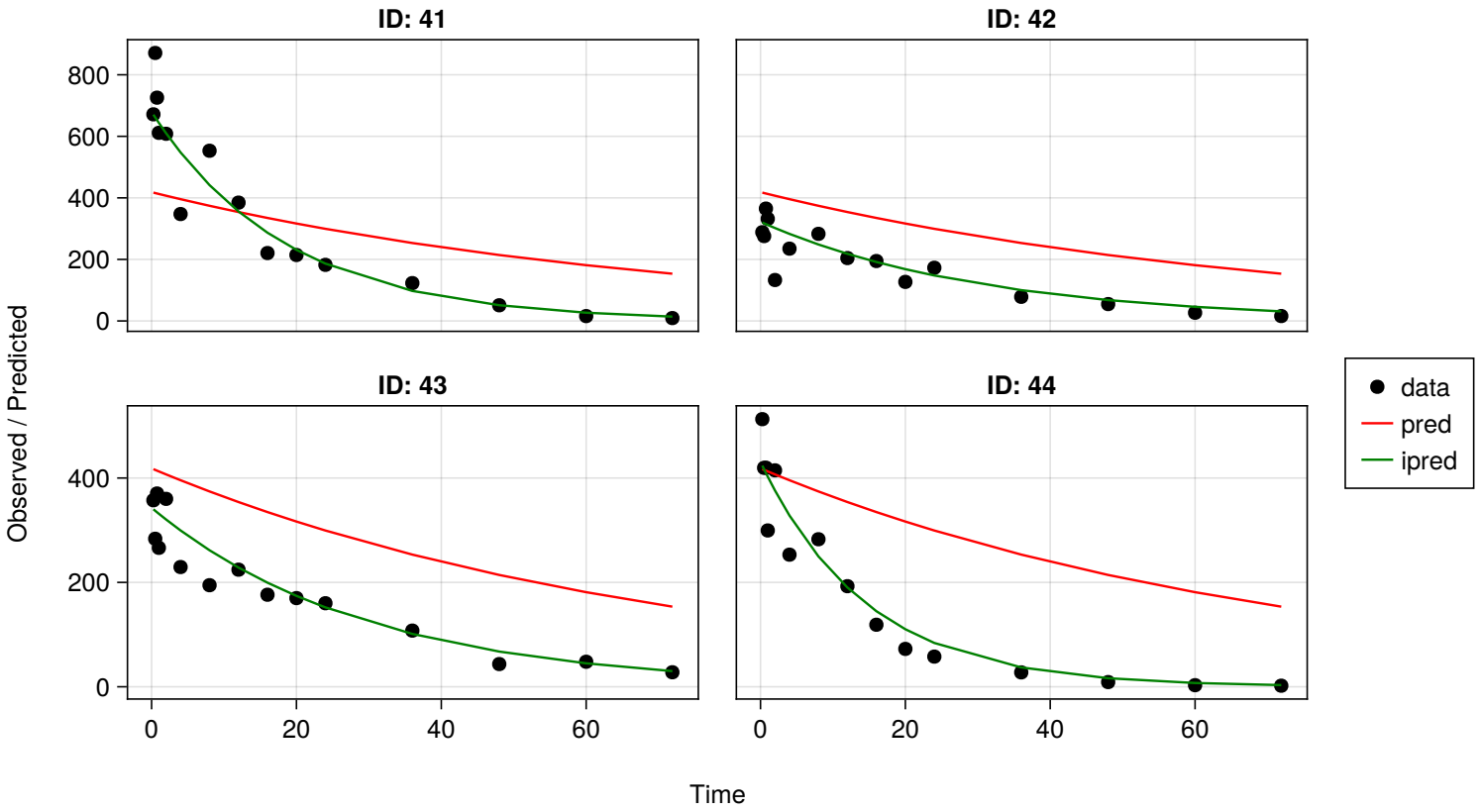

Figure 50: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (11 of 30)

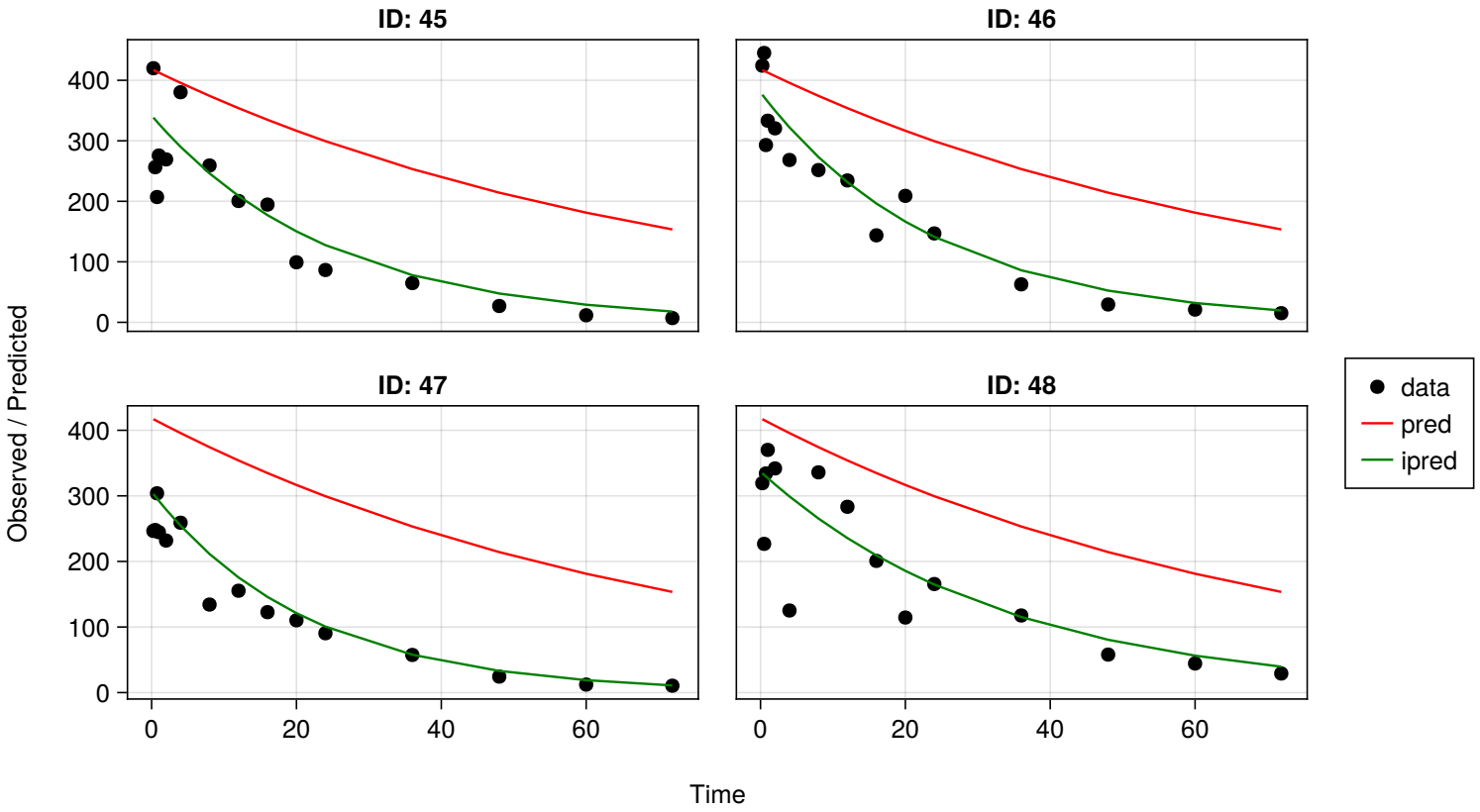

Figure 51: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (12 of 30)

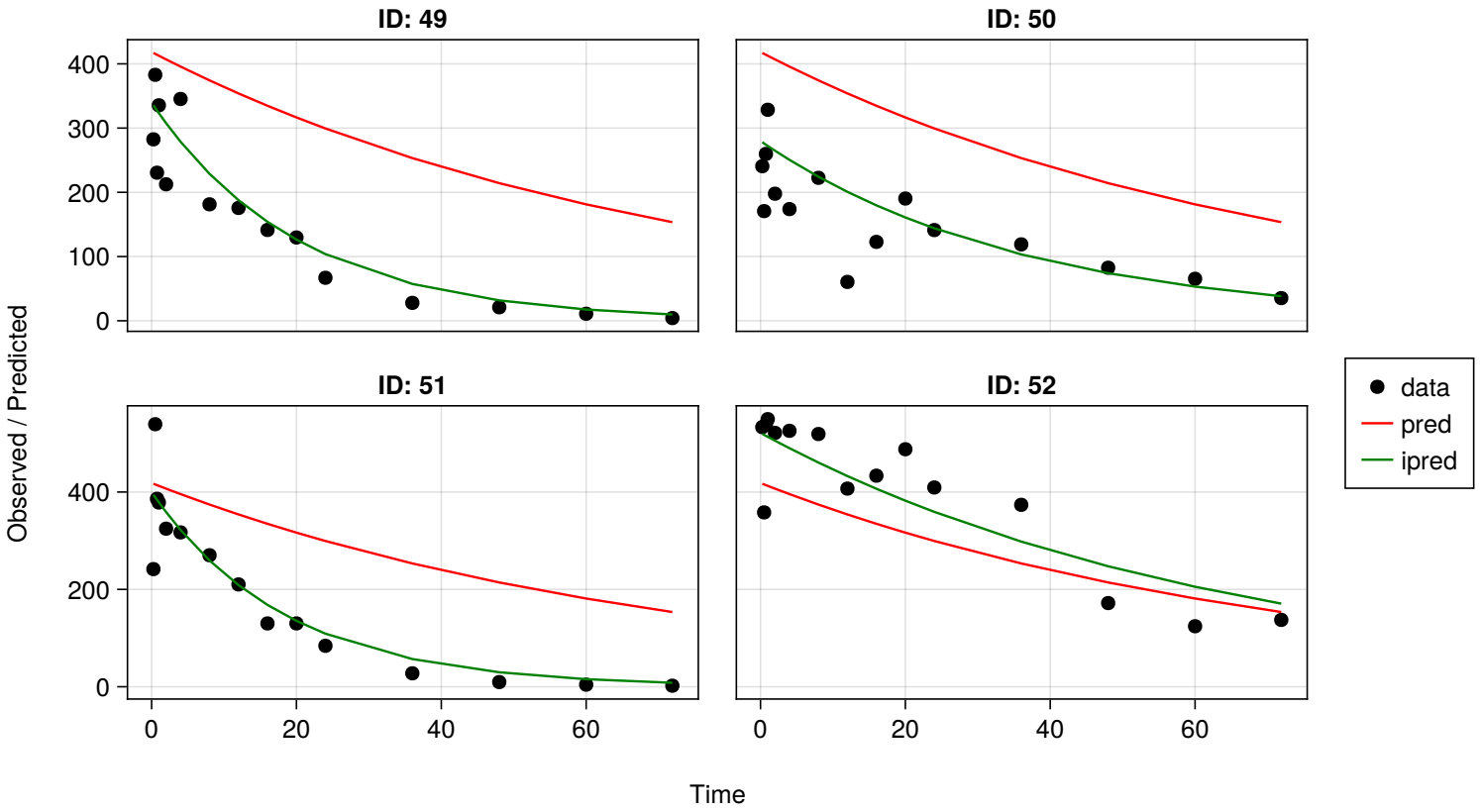

Figure 52: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (13 of 30)

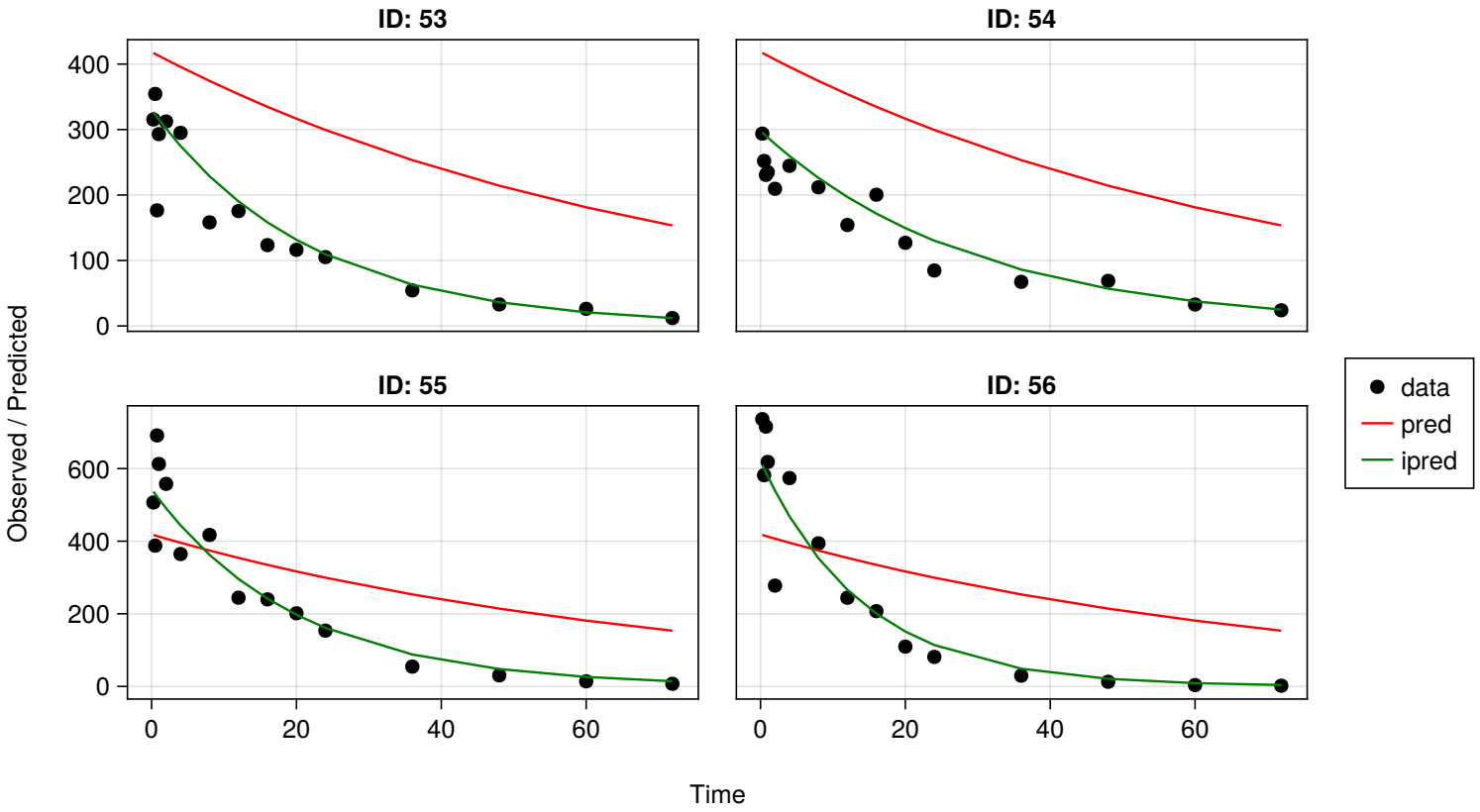

Figure 53: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (14 of 30)

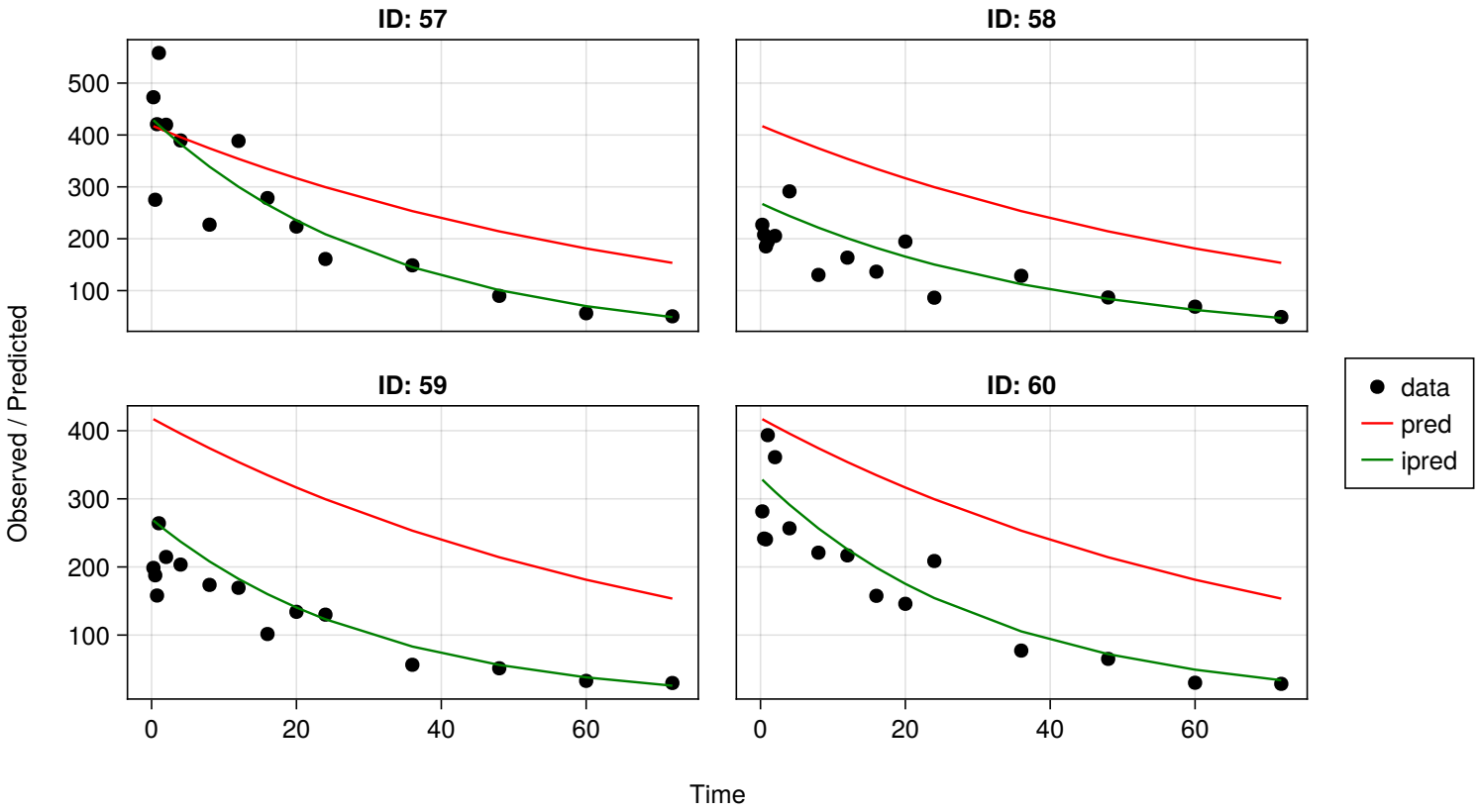

Figure 54: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (15 of 30)

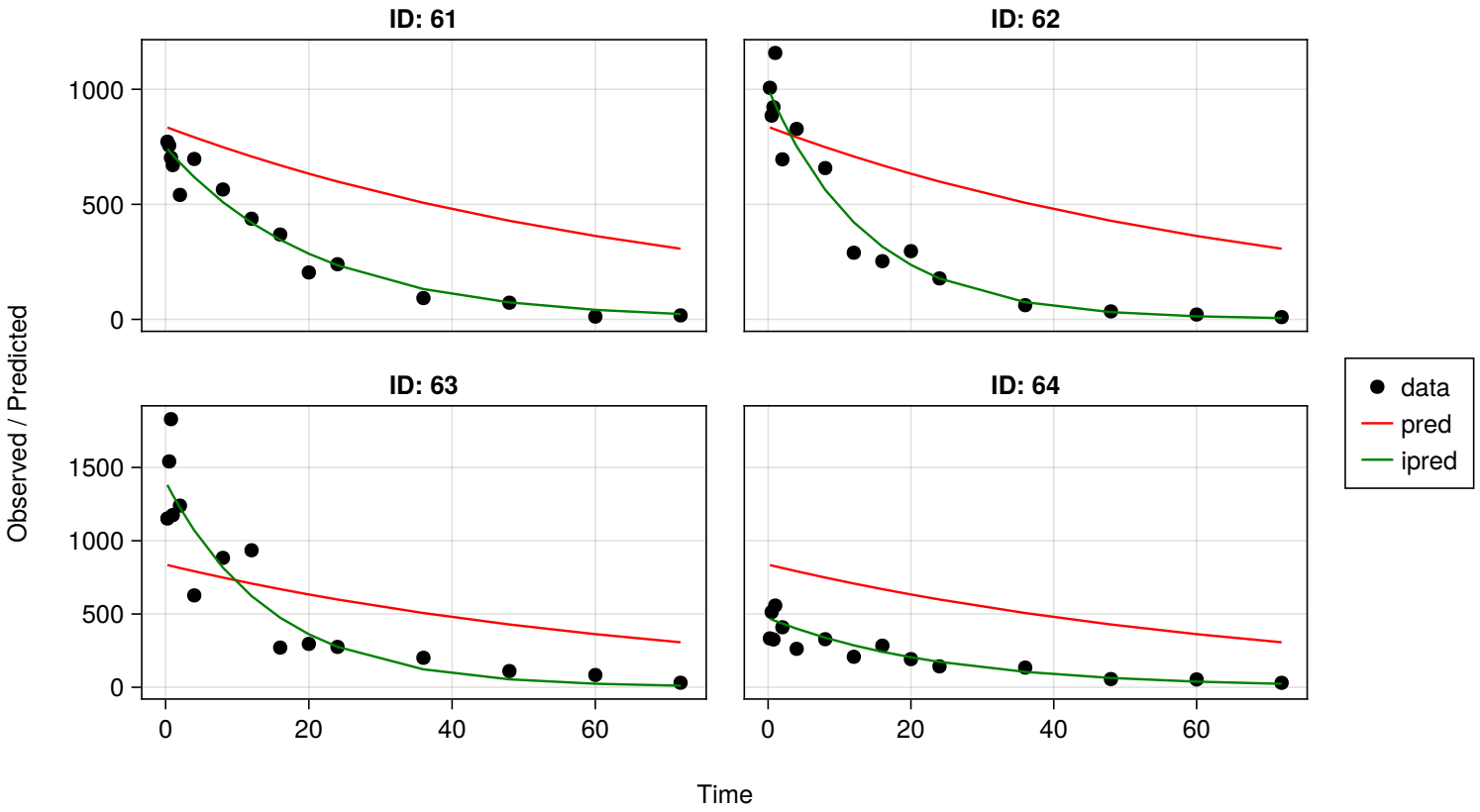

Figure 55: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (16 of 30)

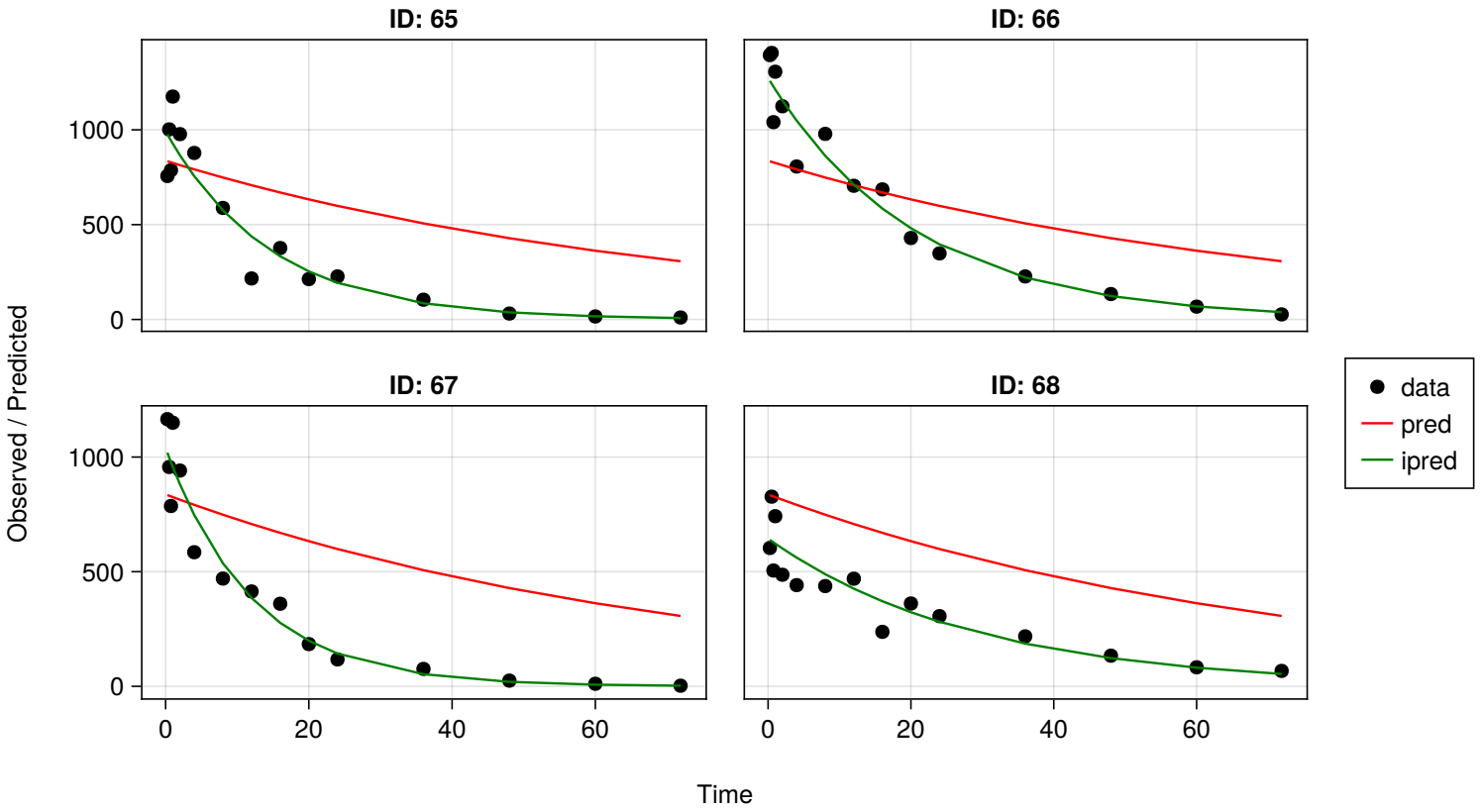

Figure 56: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (17 of 30)

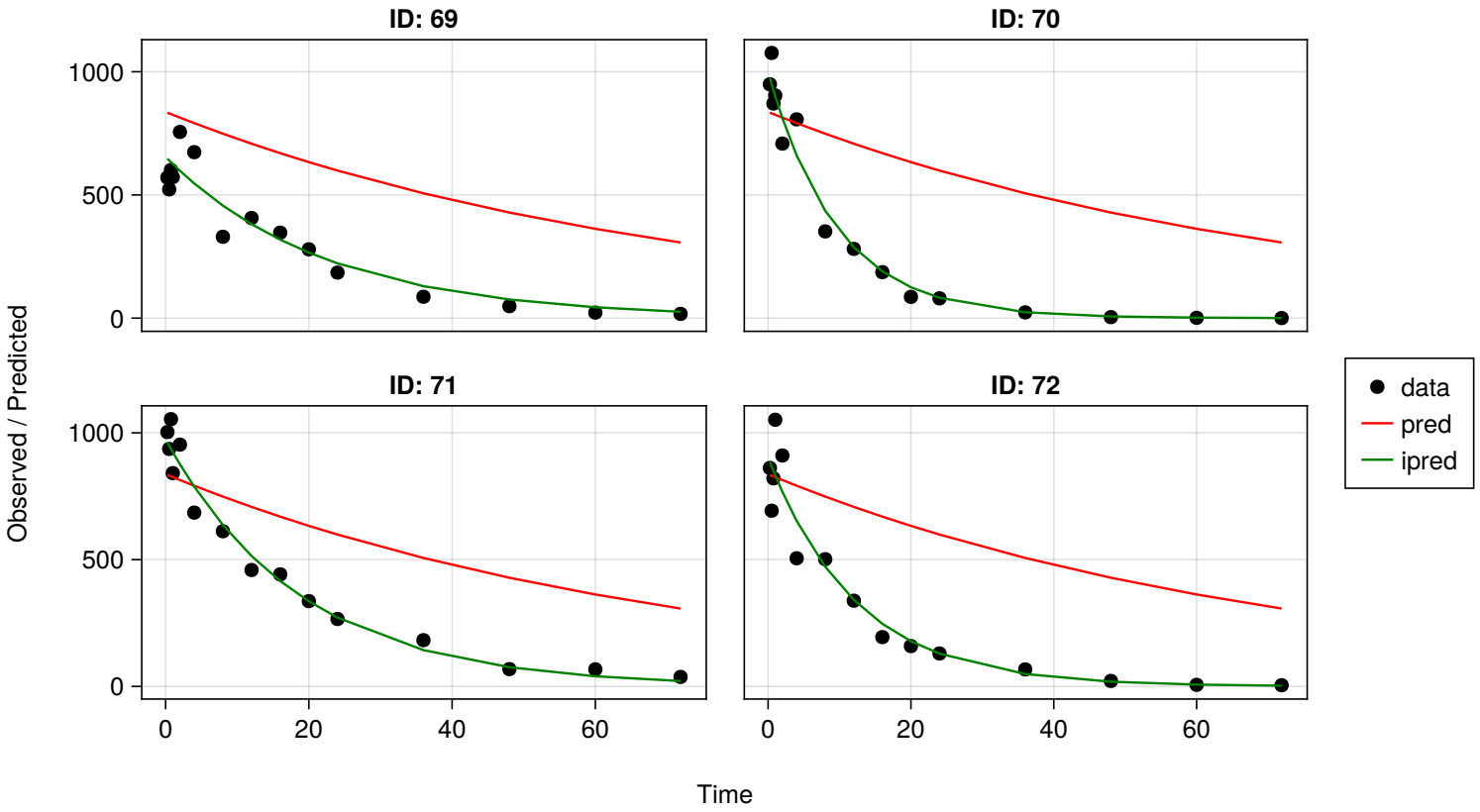

Figure 57: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (18 of 30)

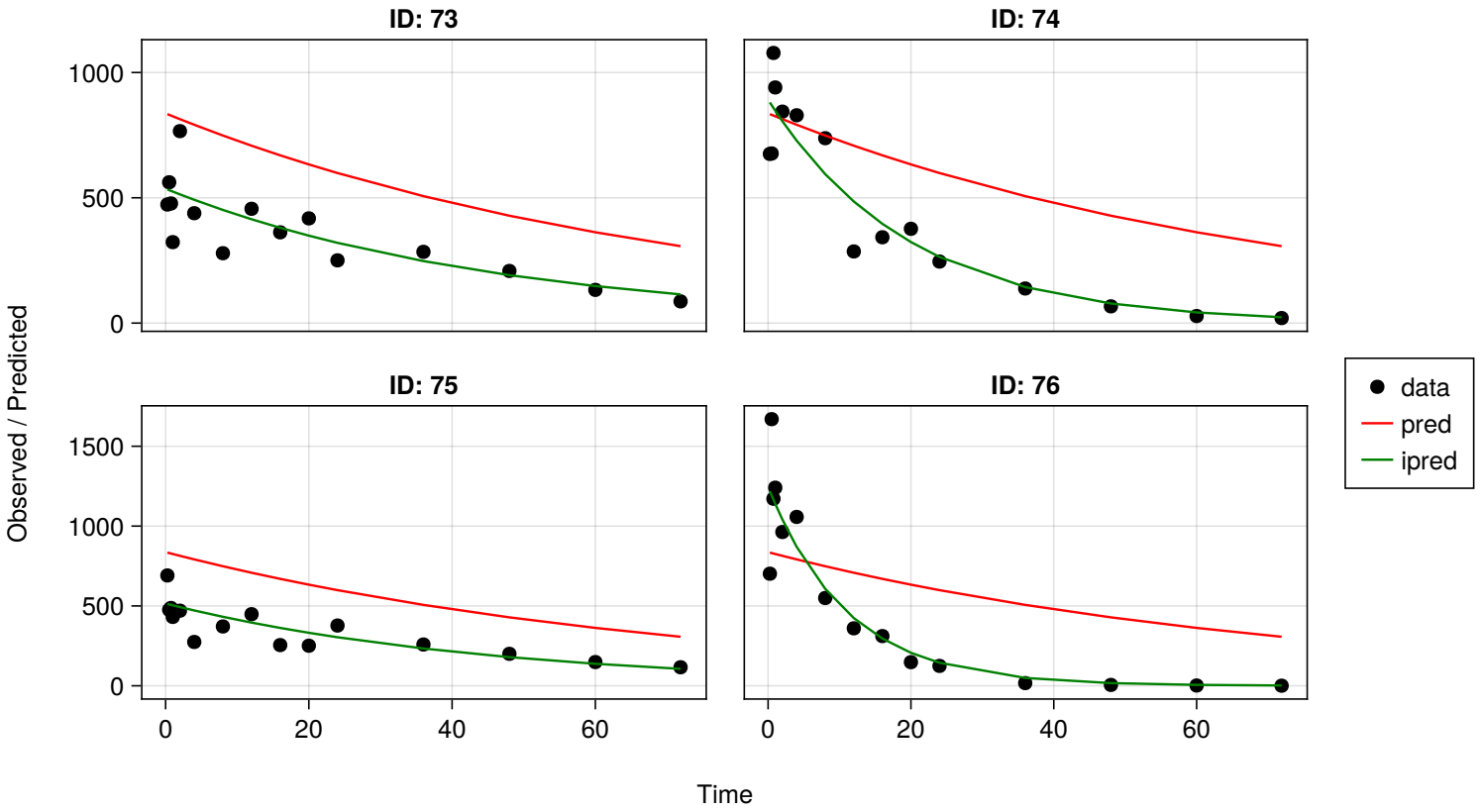

Figure 58: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (19 of 30)

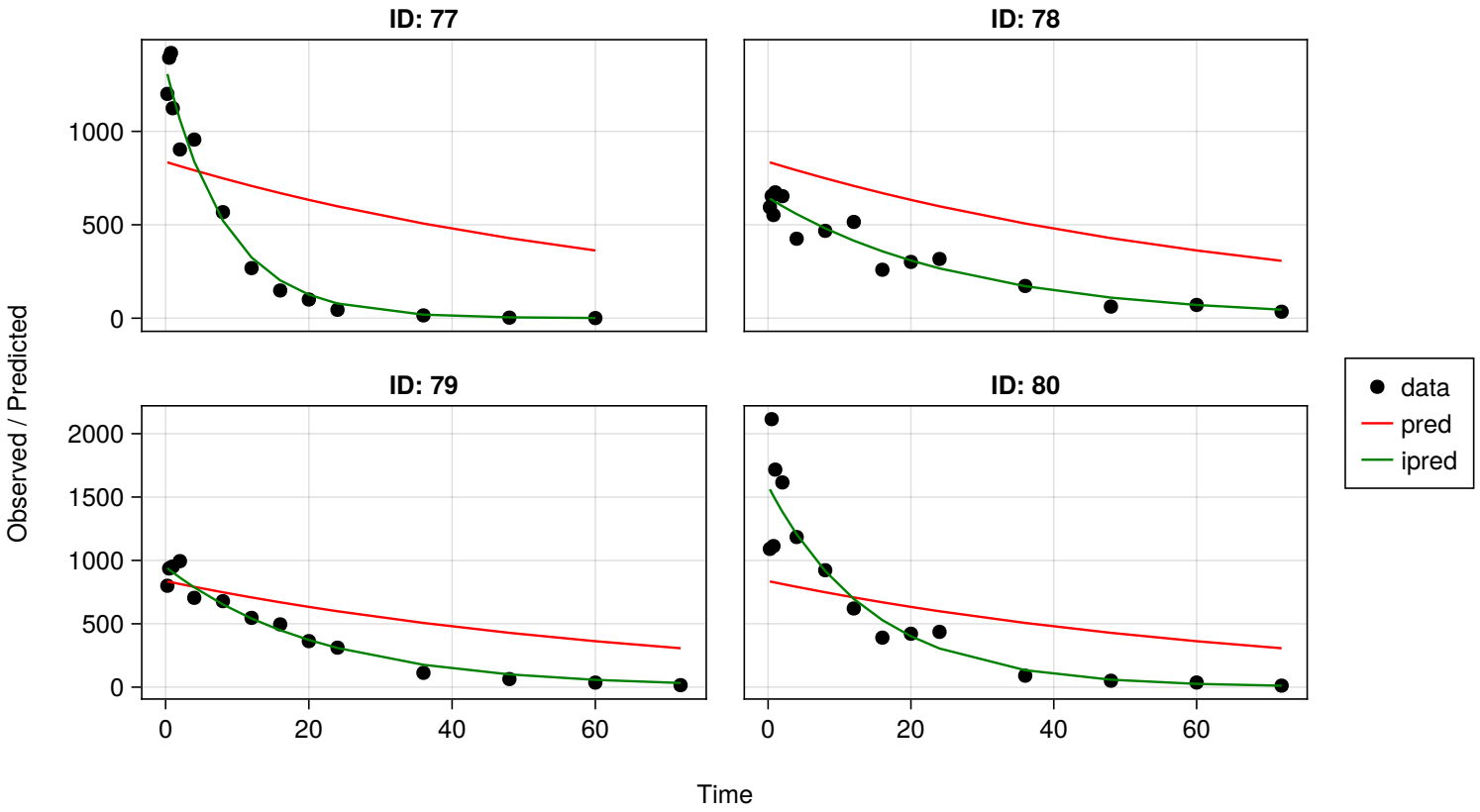

Figure 59: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (20 of 30)

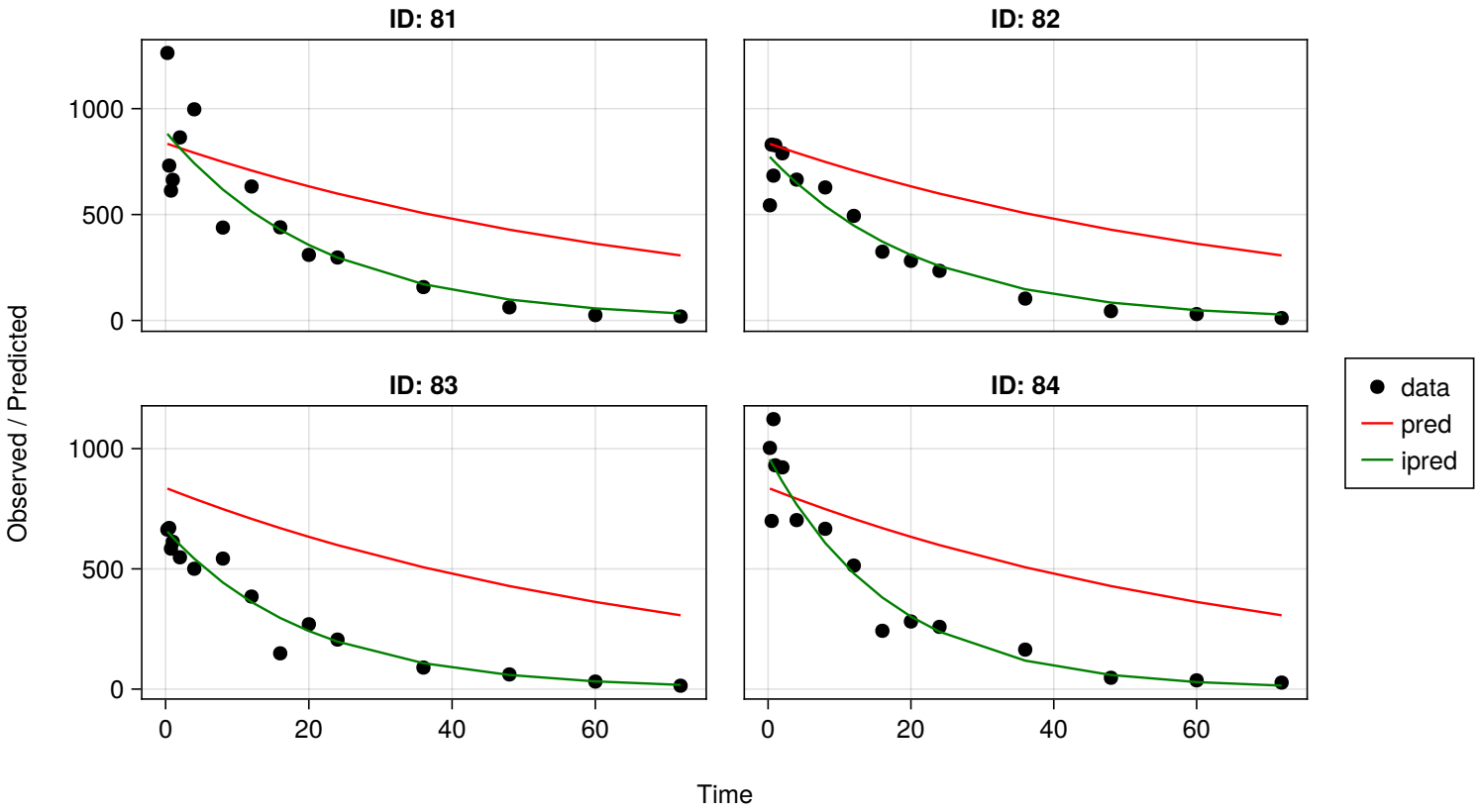

Figure 60: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (21 of 30)

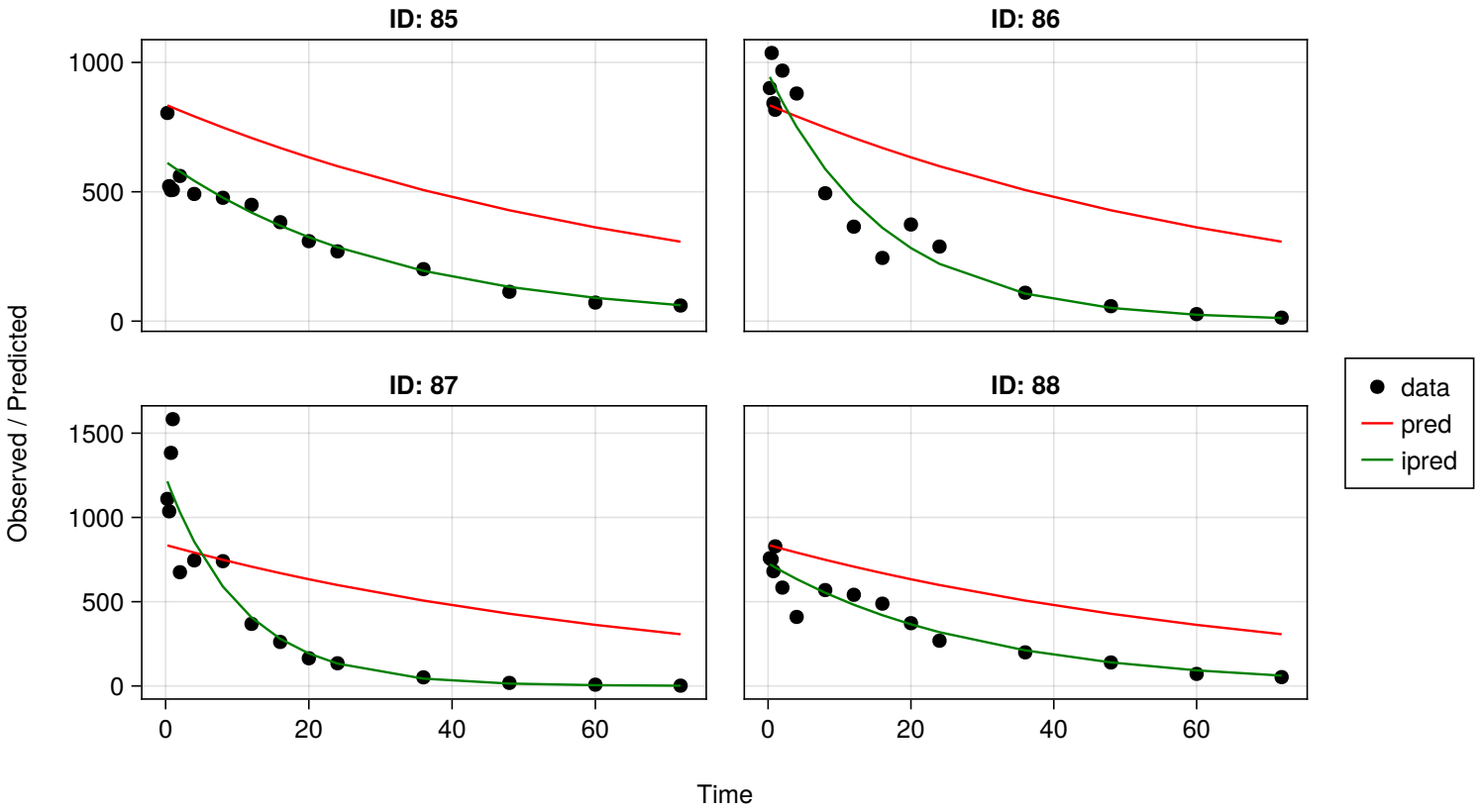

Figure 61: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (22 of 30)

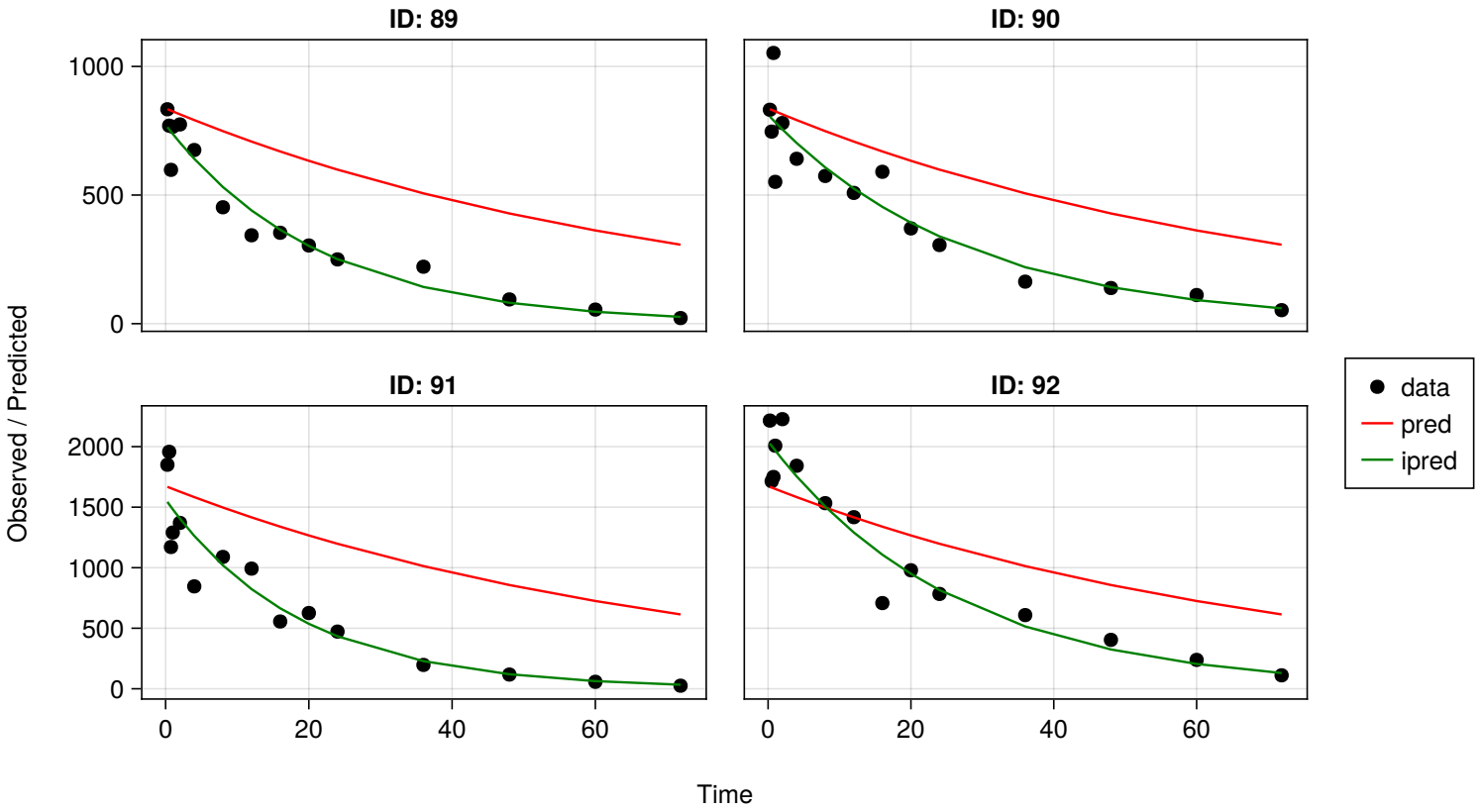

Figure 62: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (23 of 30)

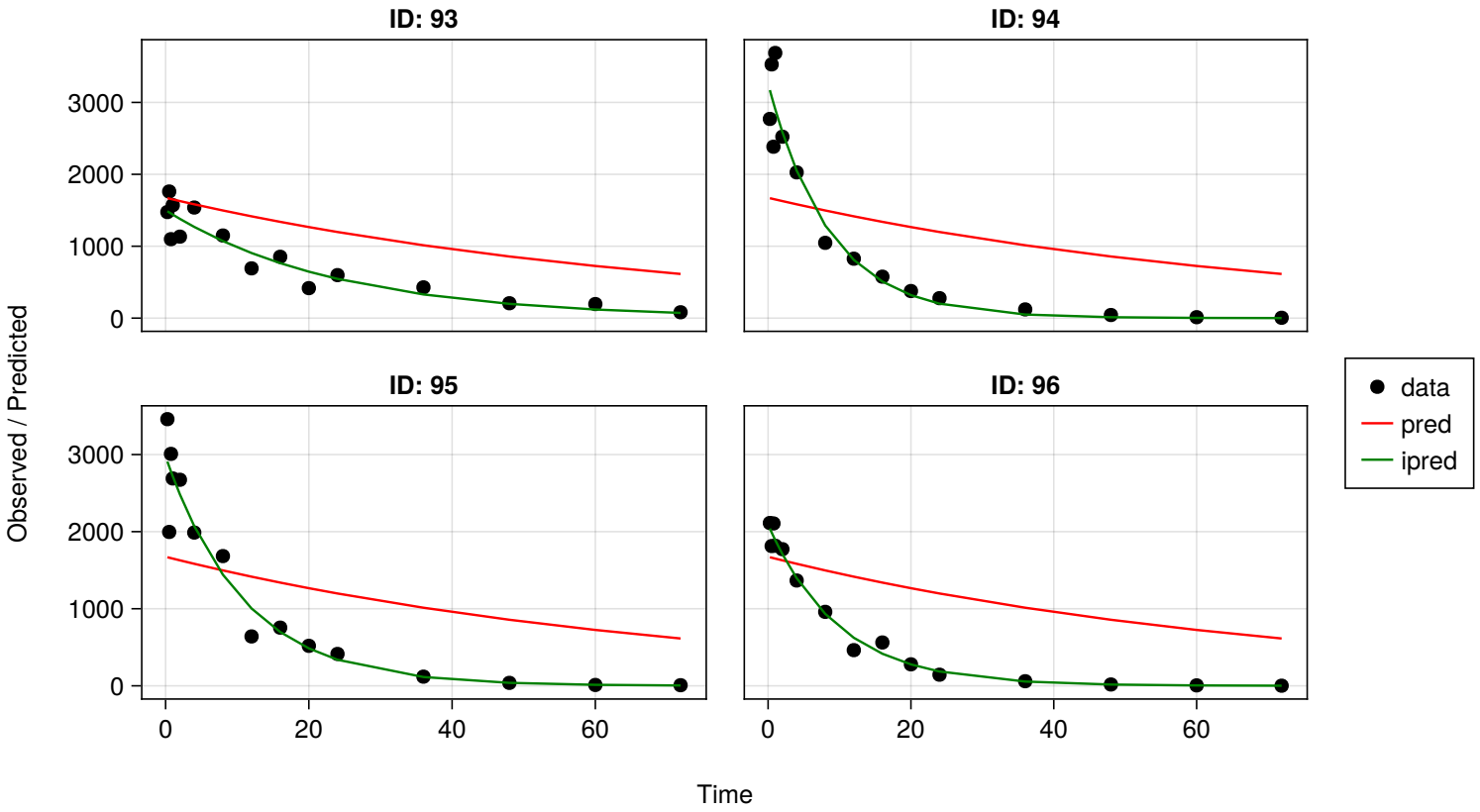

Figure 63: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (24 of 30)

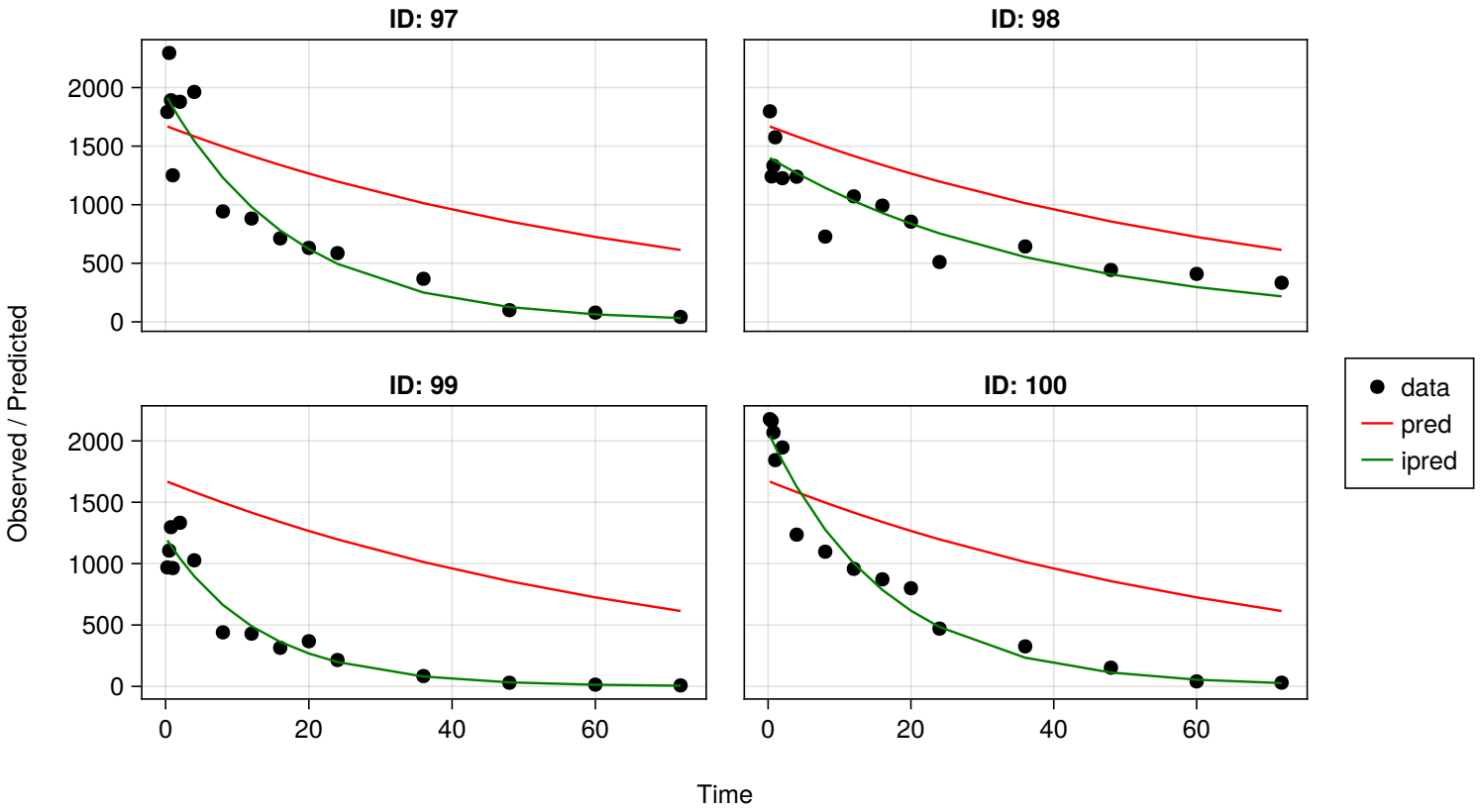

Figure 64: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (25 of 30)

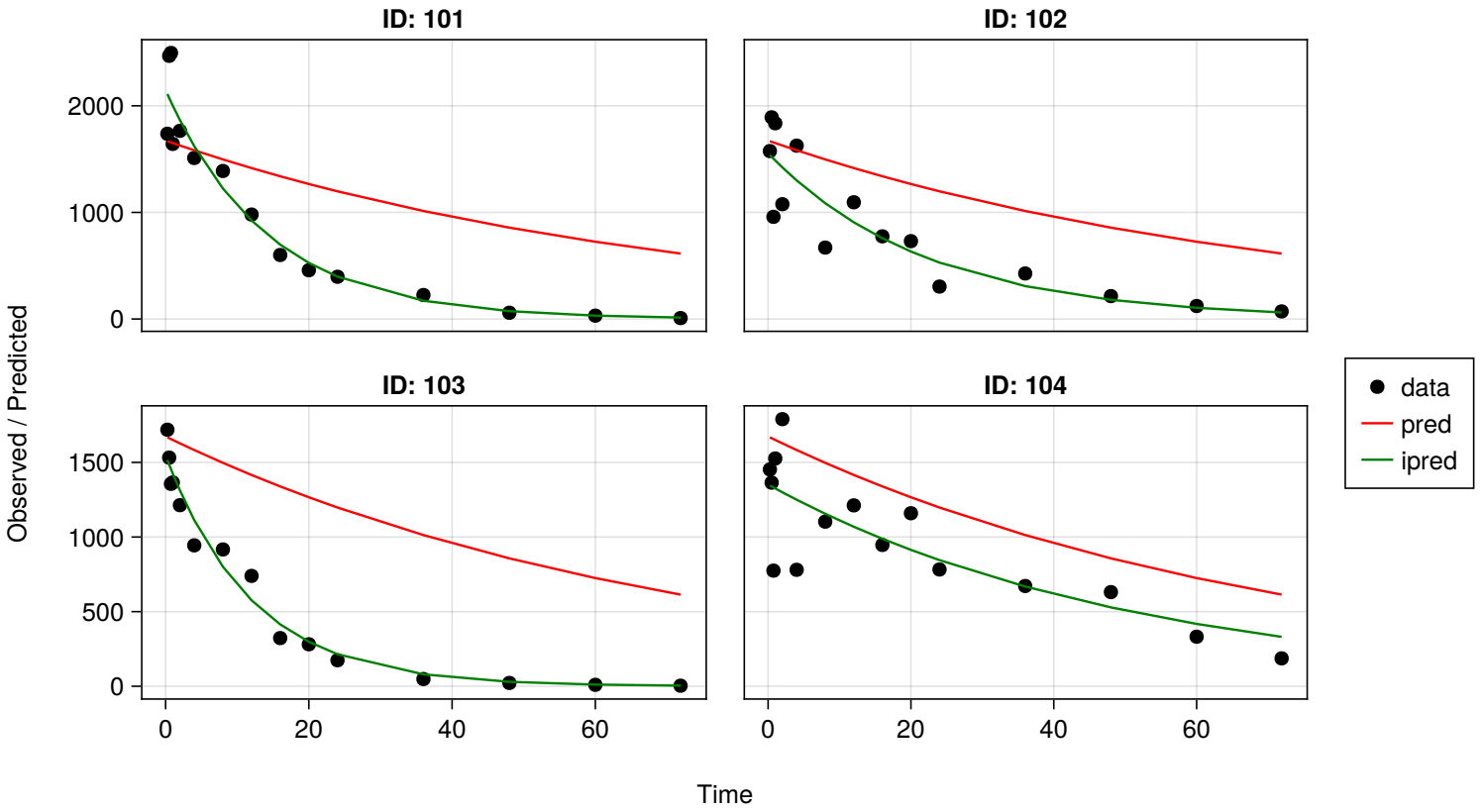

Figure 65: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (26 of 30)

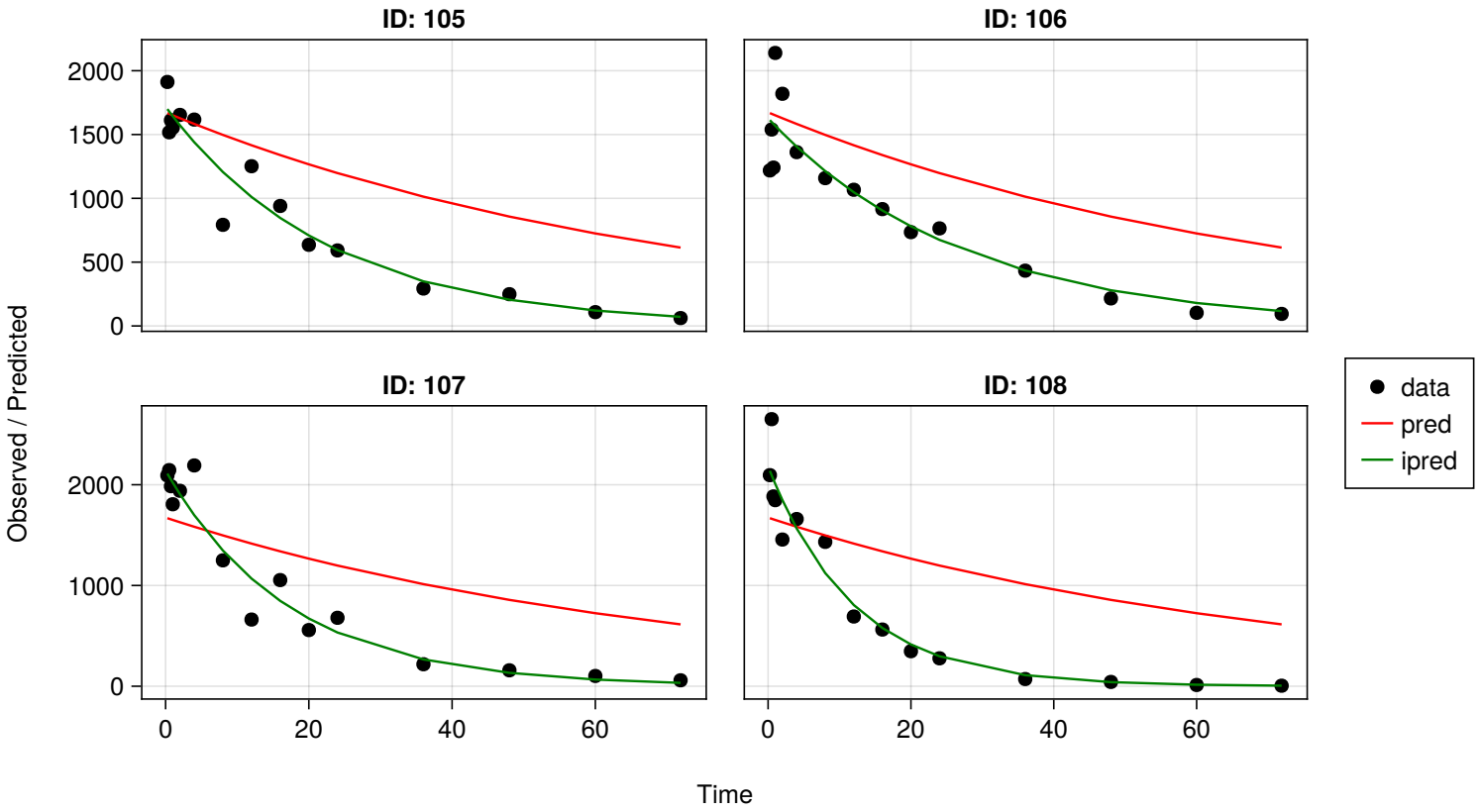

Figure 66: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (27 of 30)

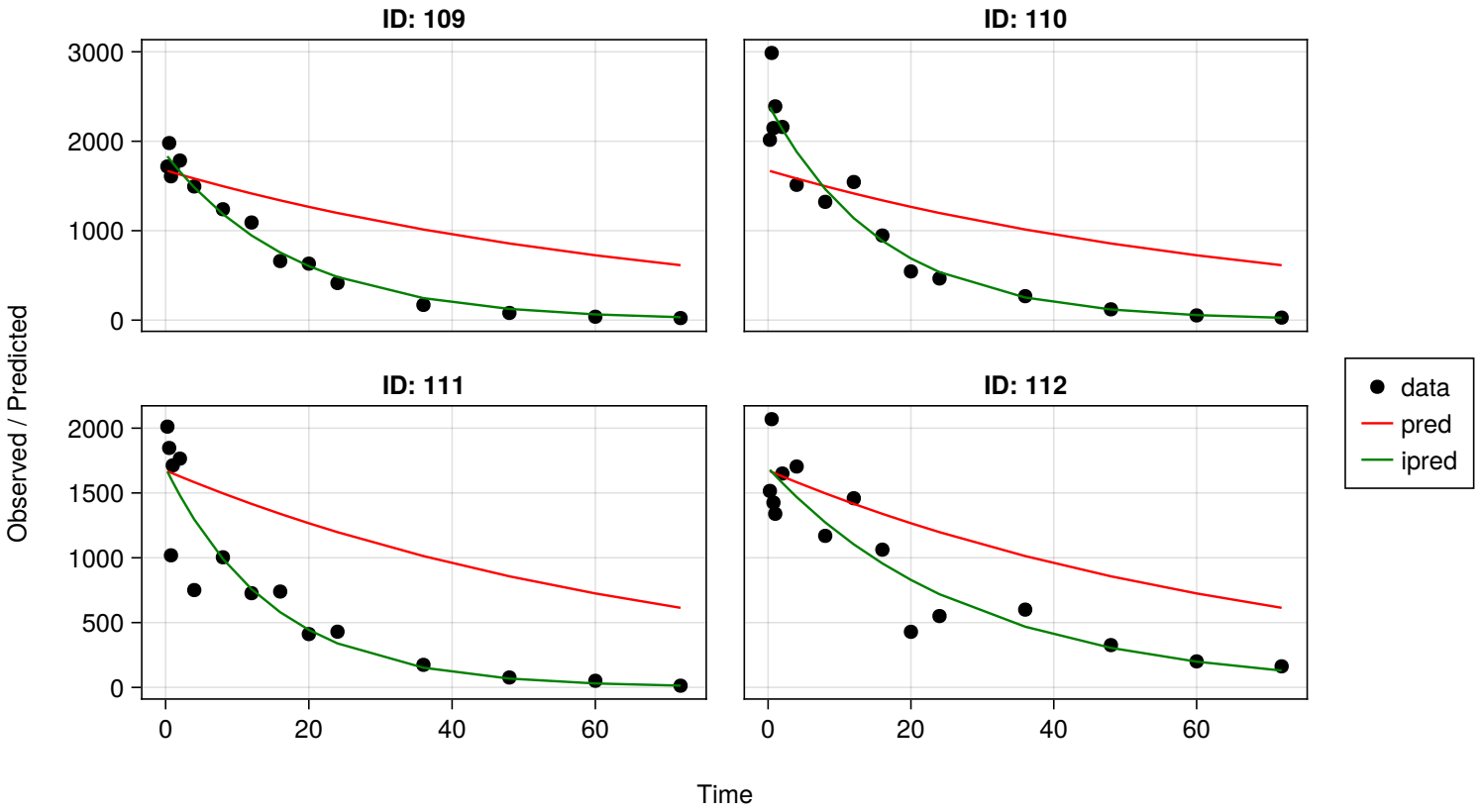

Figure 67: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (28 of 30)

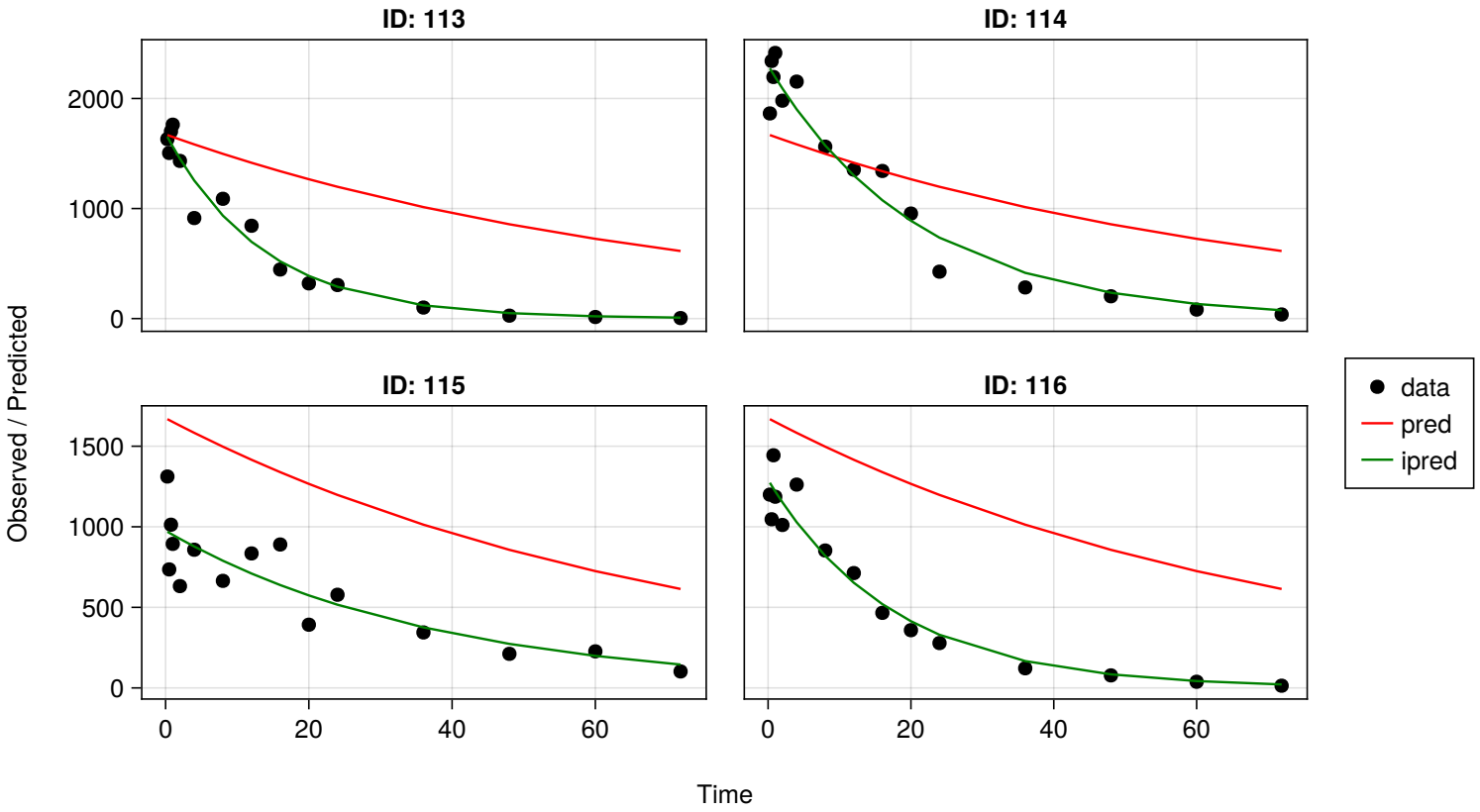

Figure 68: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (29 of 30)

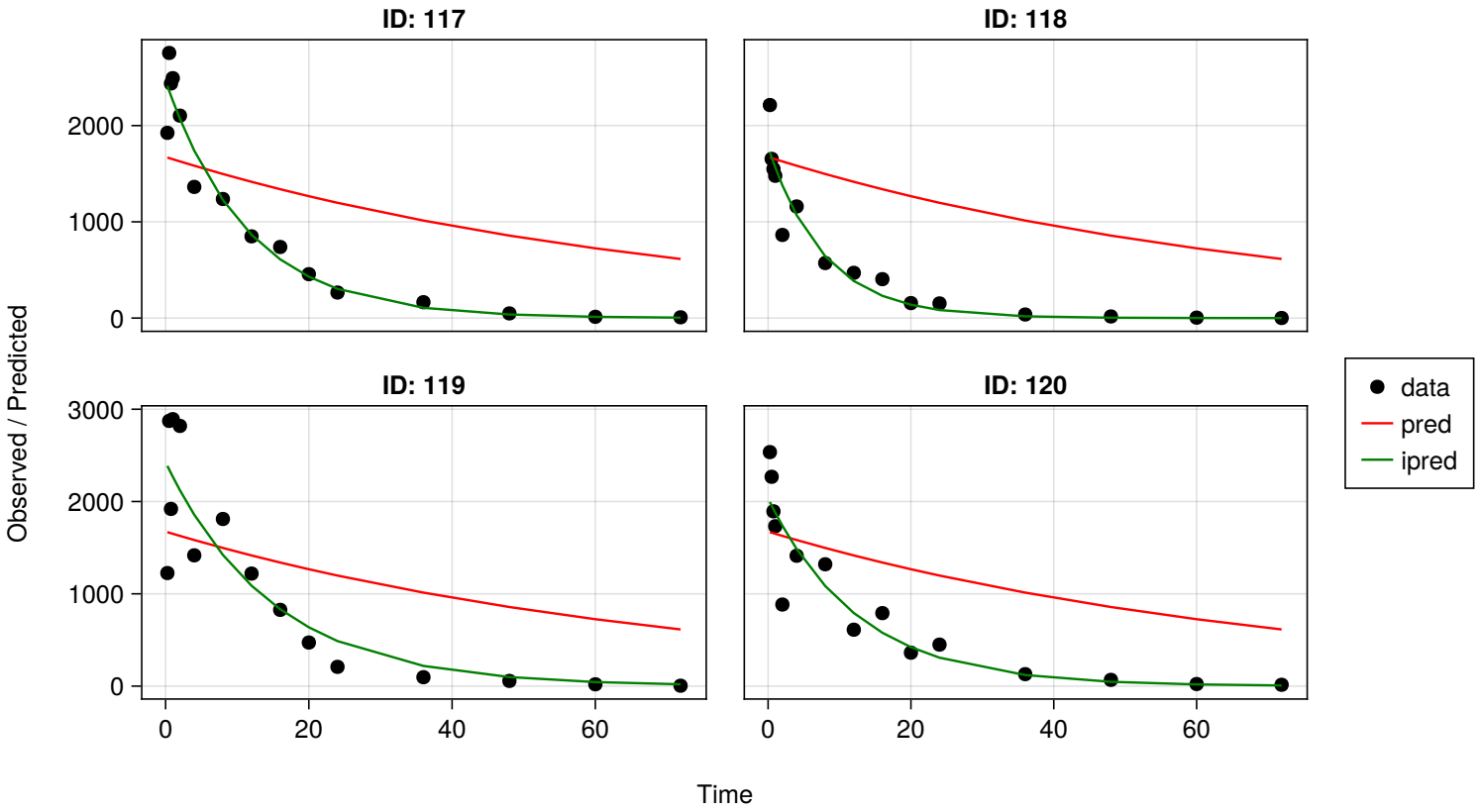

Figure 69: FOCE_constantcoef: Population and individual predictions overlaid over observations for Observed (dv) by ID (30 of 30)

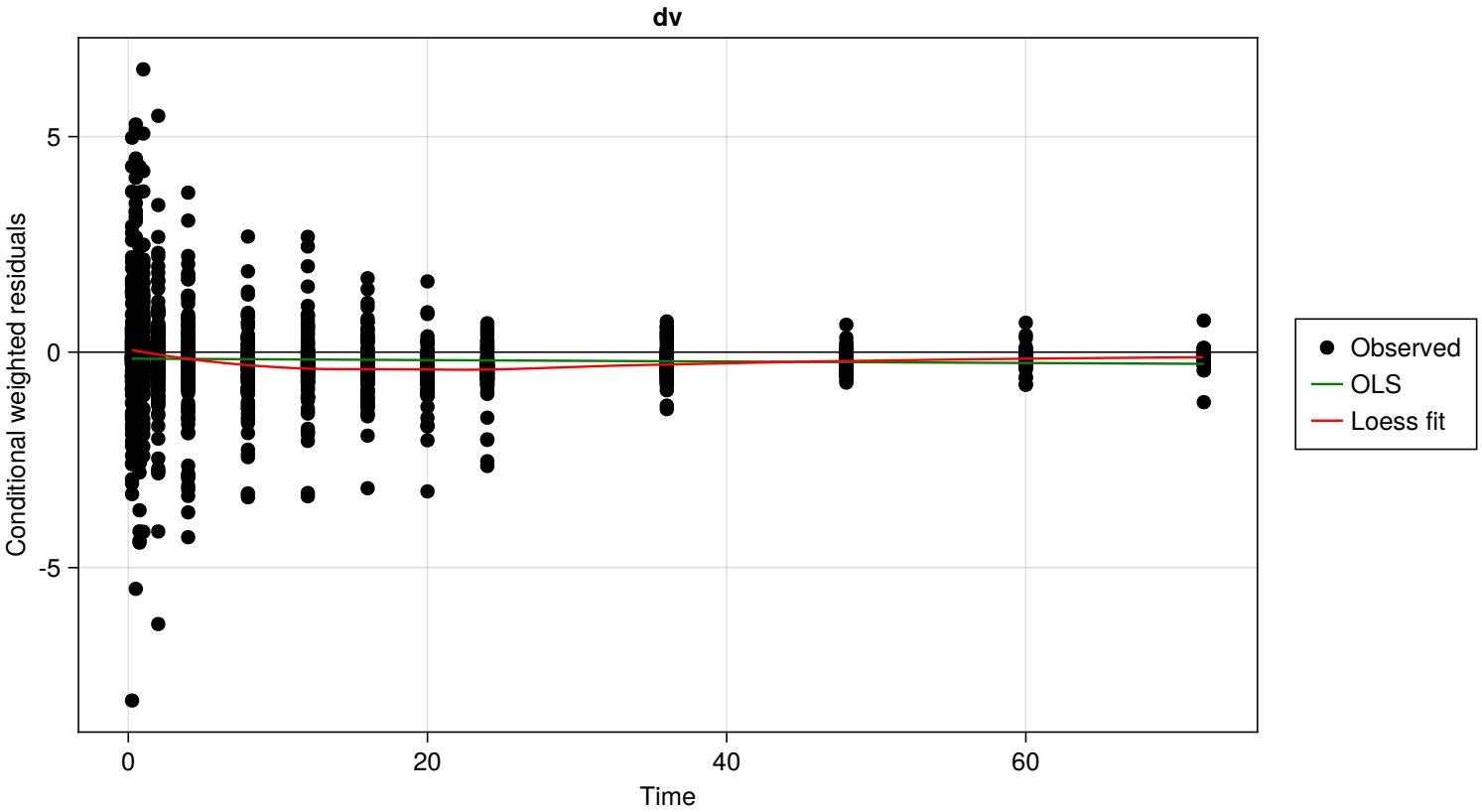

Figure 70: FOCE_constantcoef: Conditional weighted residuals Observed (dv) vs Time (1 of 1)

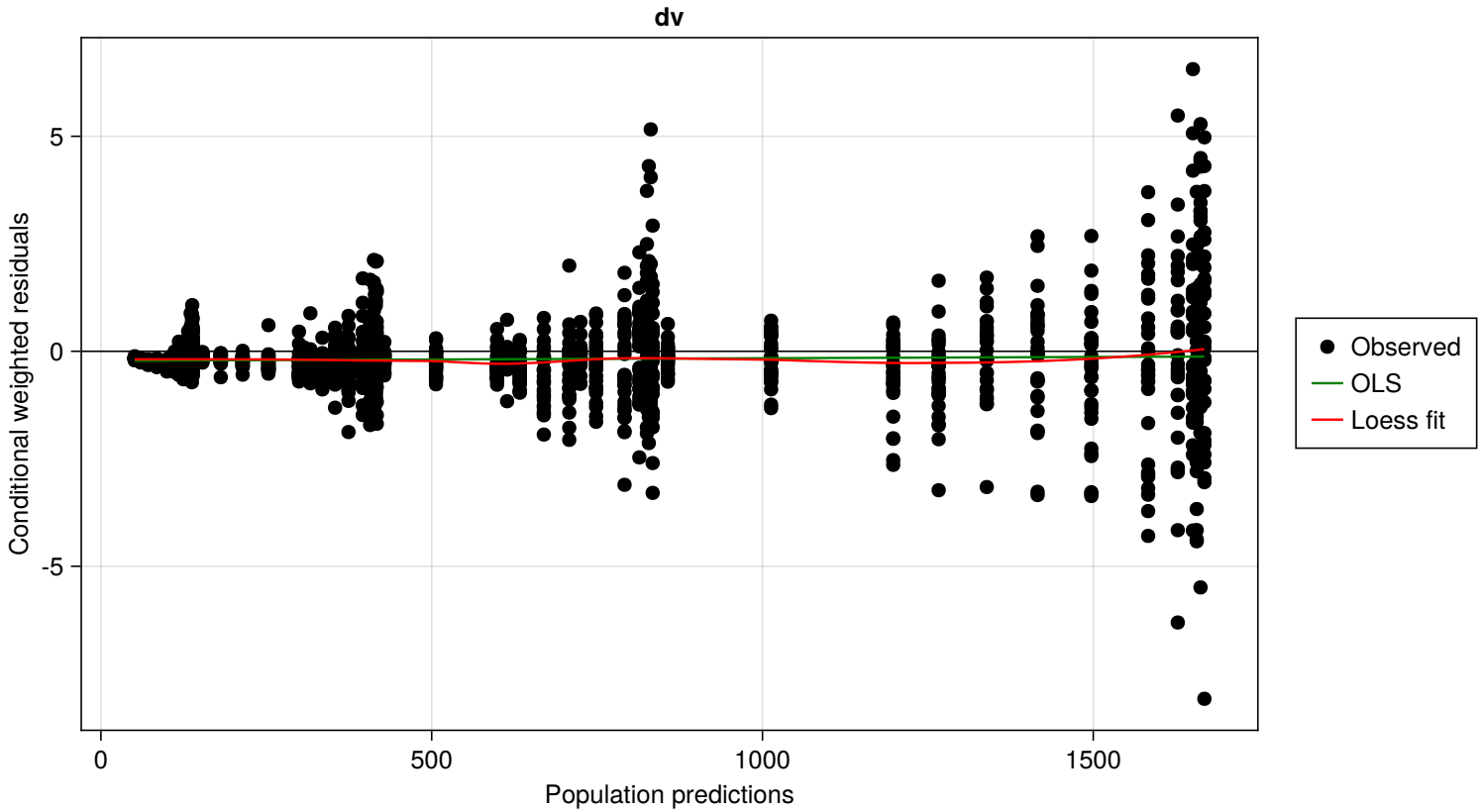

Figure 71: FOCE_constantcoef: Conditional weighted residuals Observed (dv) vs predictions (1 of 1)

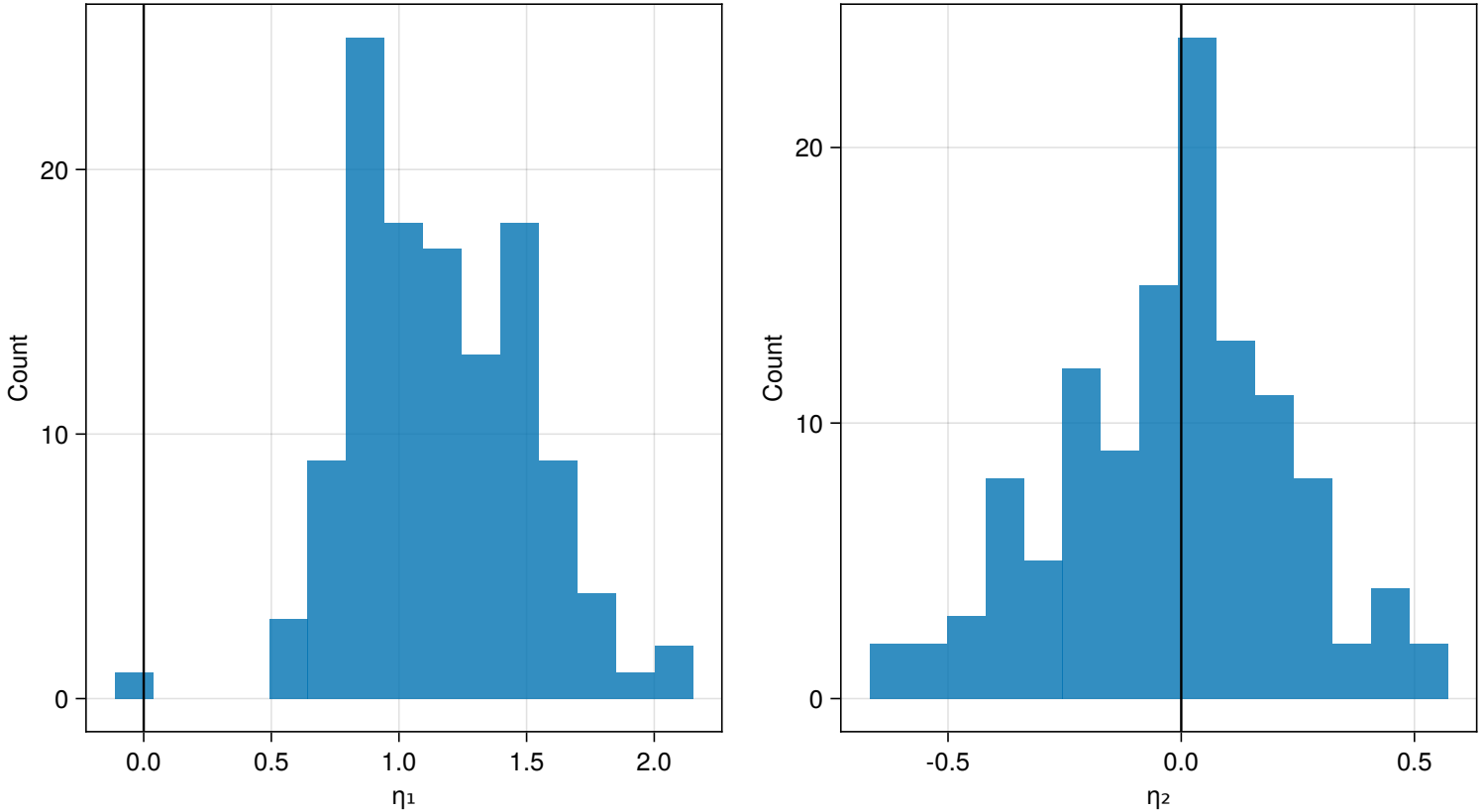

Figure 72: FOCE_constantcoef: Distribution of random effects (1 of 1)

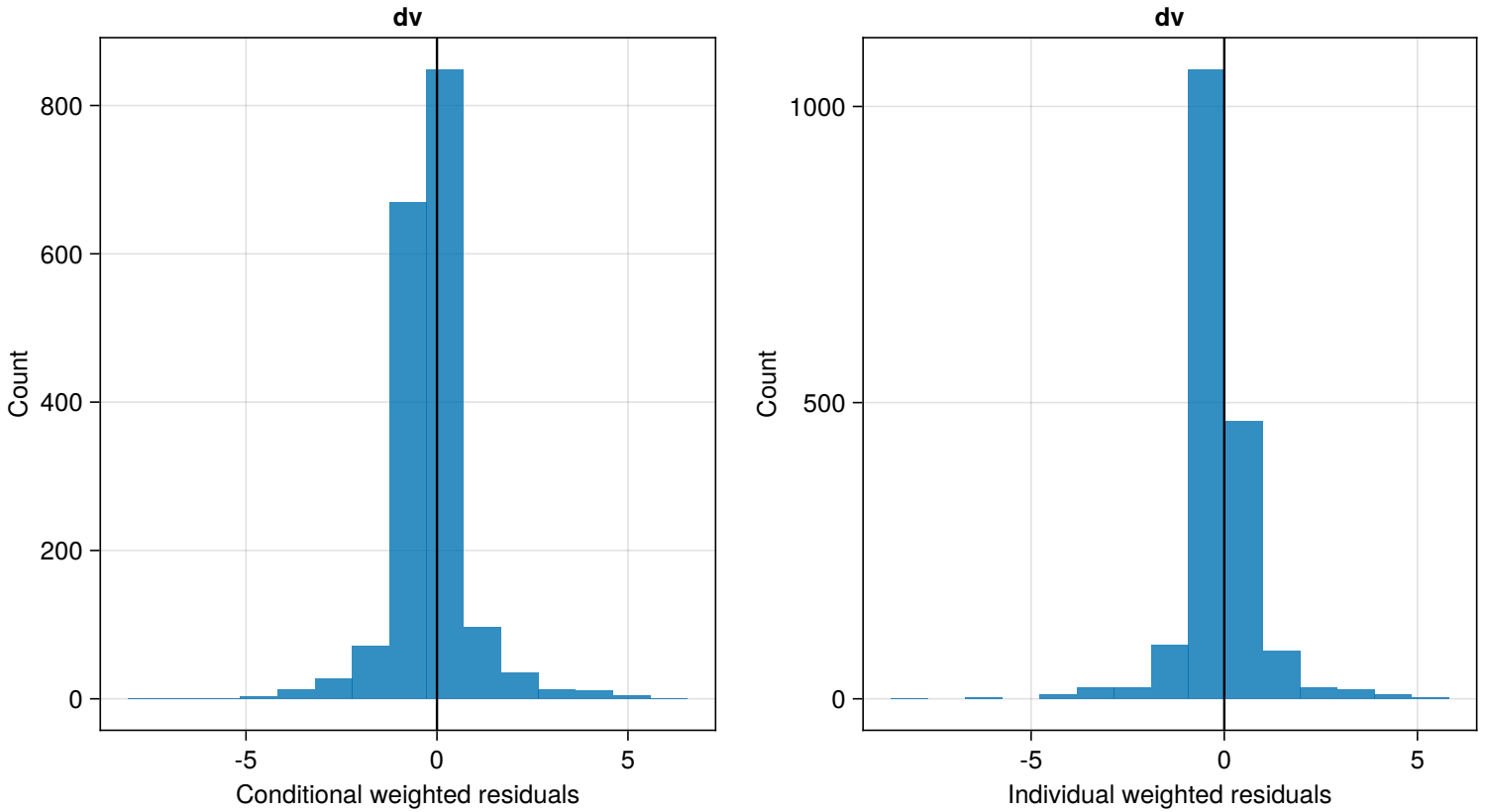

Figure 73: FOCE_constantcoef: Distribution of weighted residuals Observed (dv) (1 of 1)

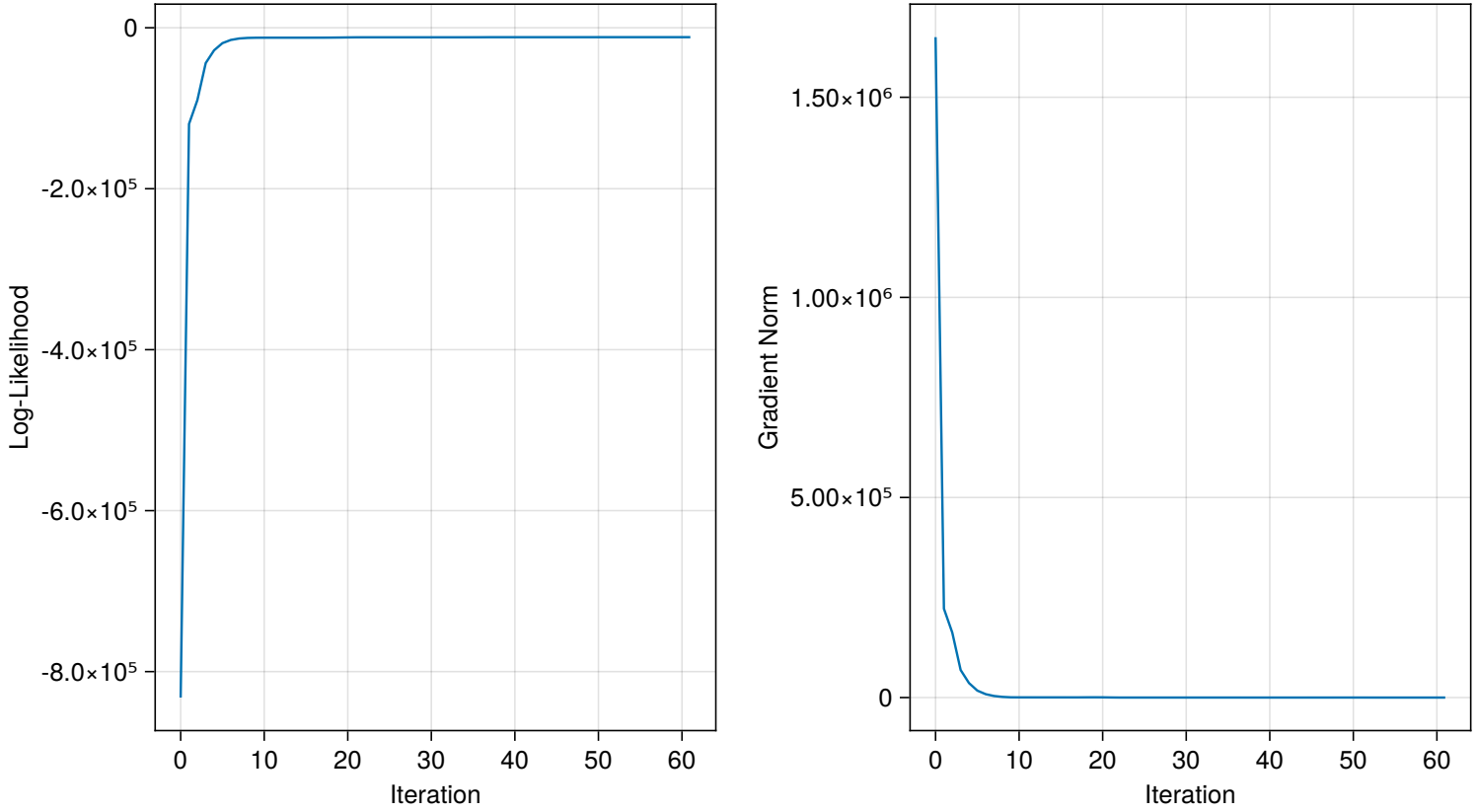

Figure 74: FOCE_constantcoef: Traceplot of loglikelihood and gradient norm (1 of 1)

6.3 LaplaceI

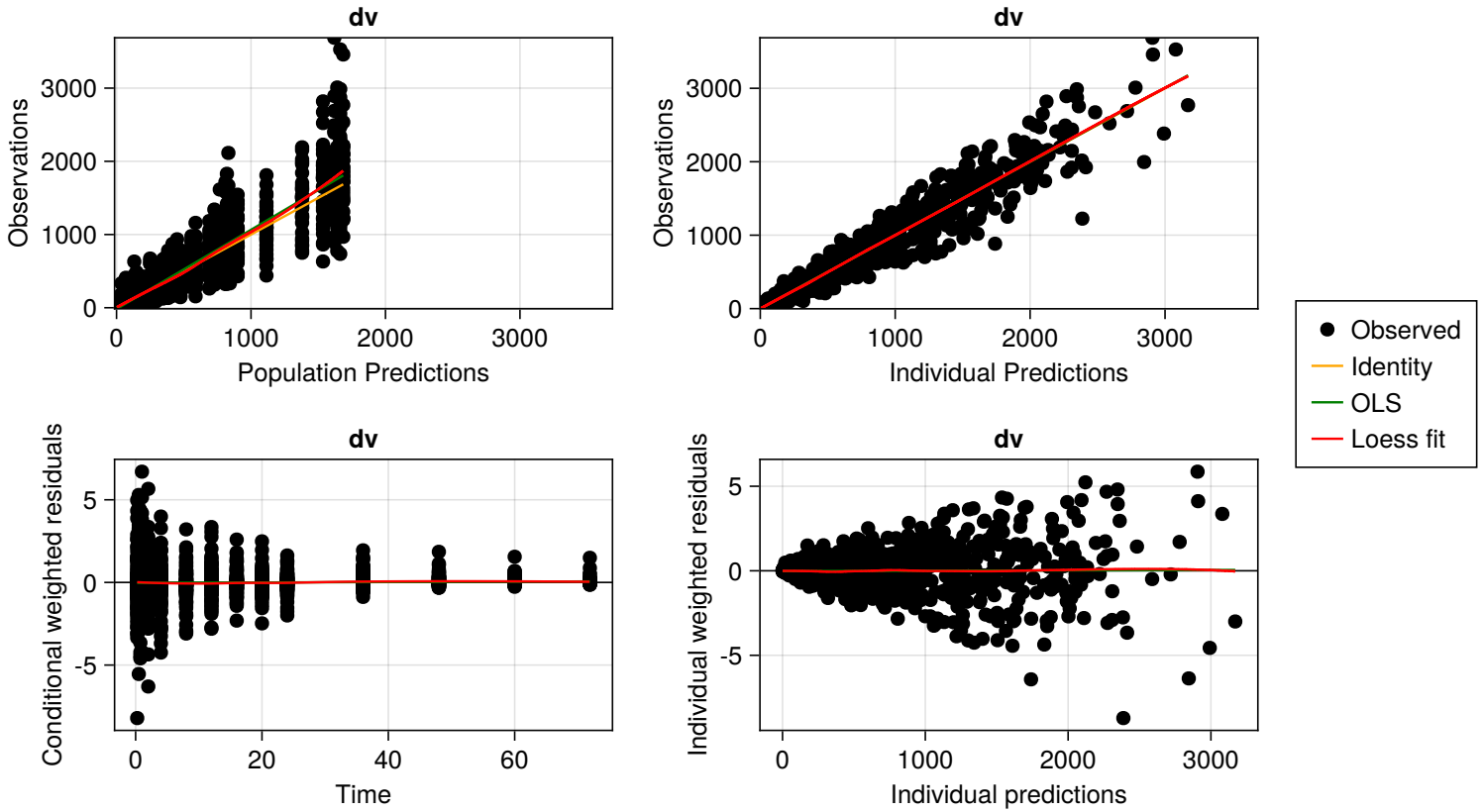

Figure 75: LaplaceI: Goodness of fit plots showcasing observations (dv) versus population and individual predictions (top panel) and, weighted residuals (dv) vs population predictions and individual weighted residuals vs time (bottom panel) (1 of 1)

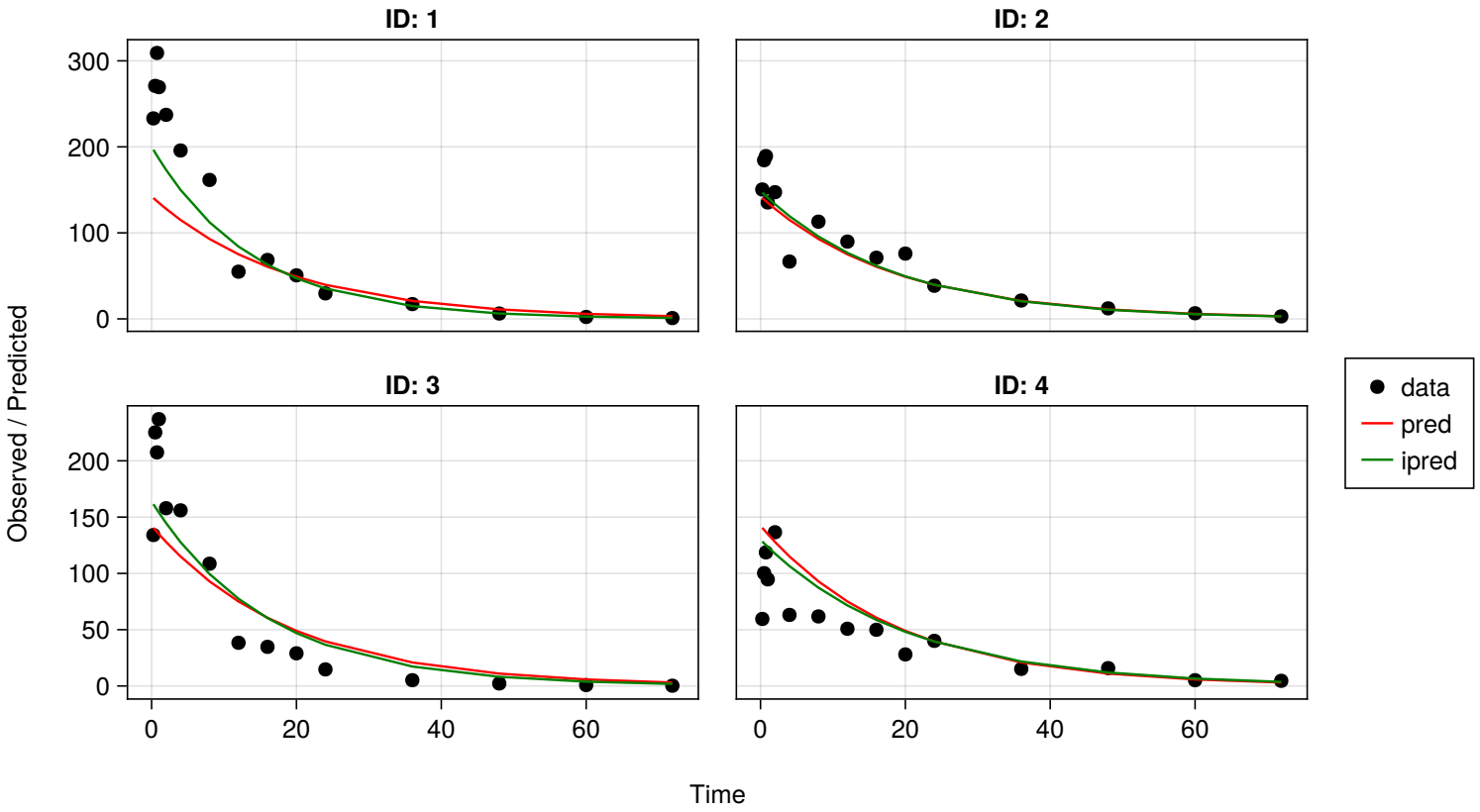

Figure 76: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (1 of 30)

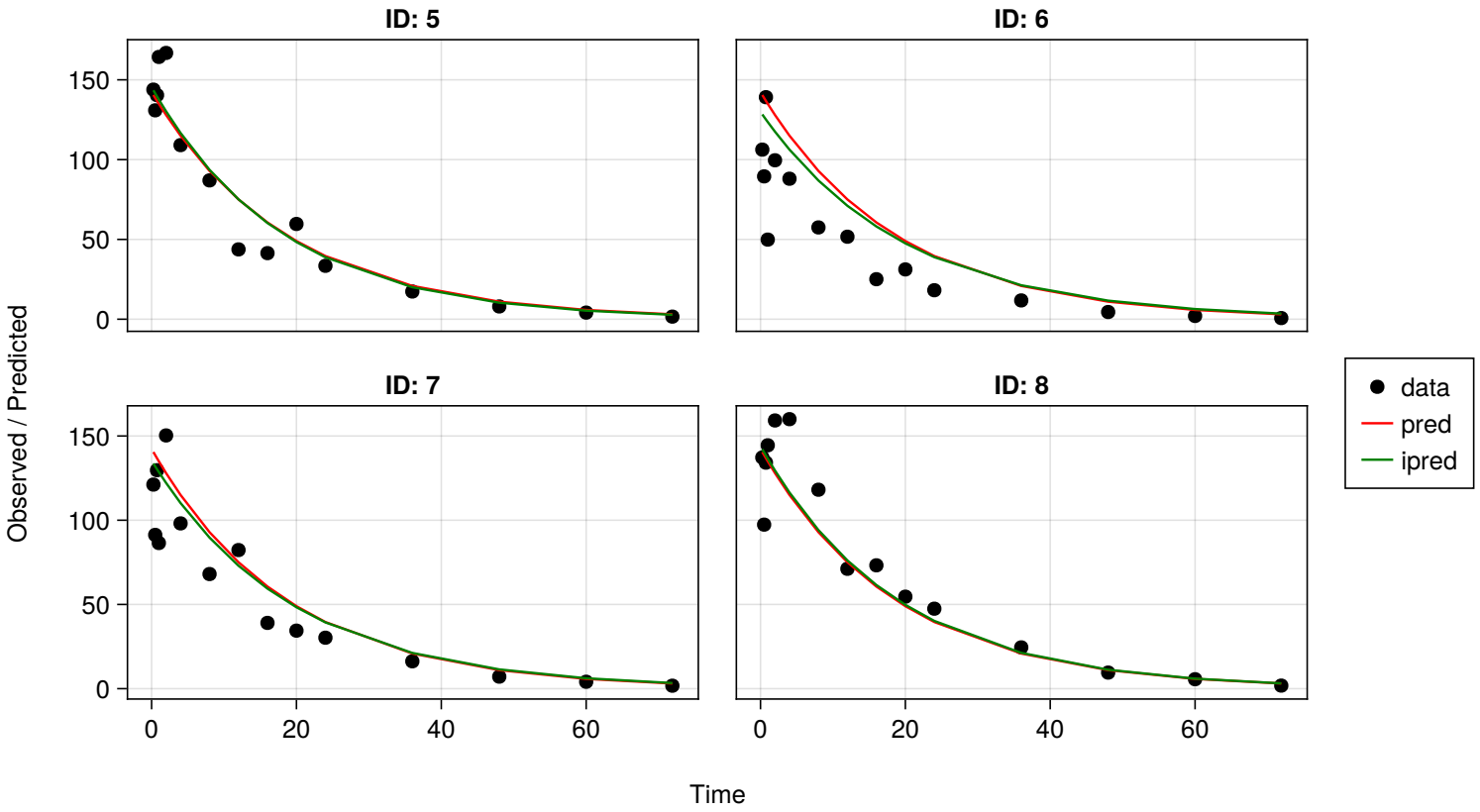

Figure 77: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (2 of 30)

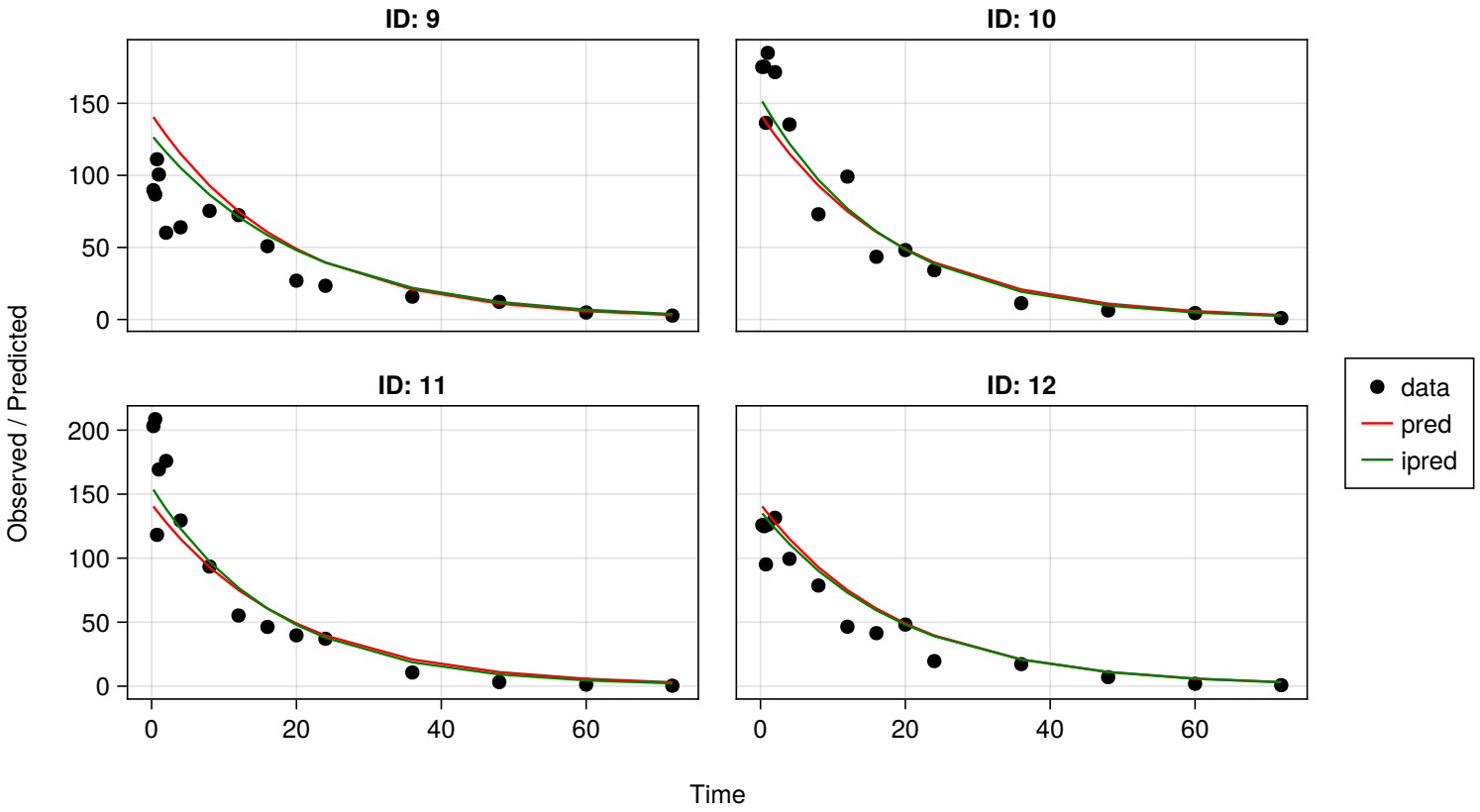

Figure 78: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (3 of 30)

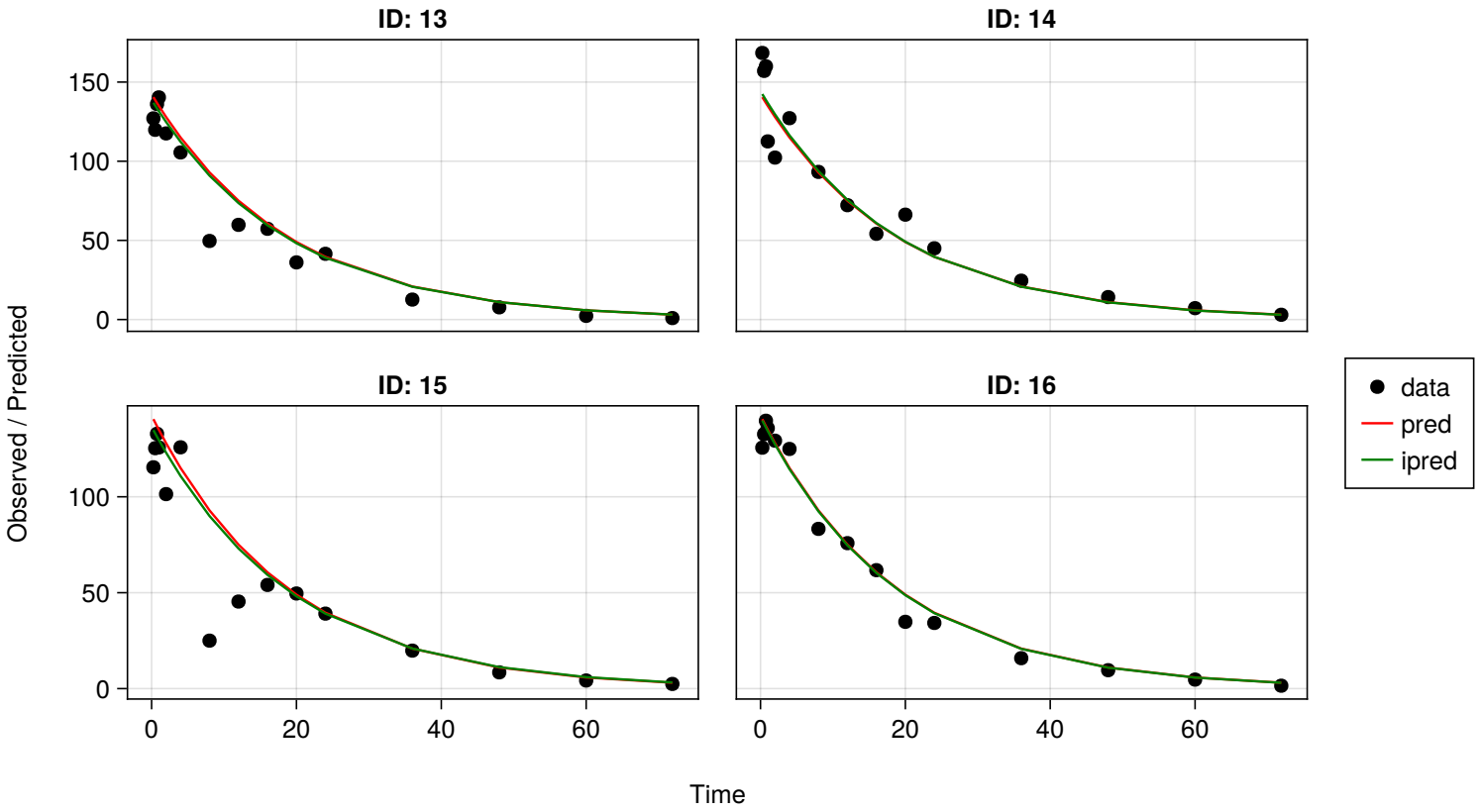

Figure 79: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (4 of 30)

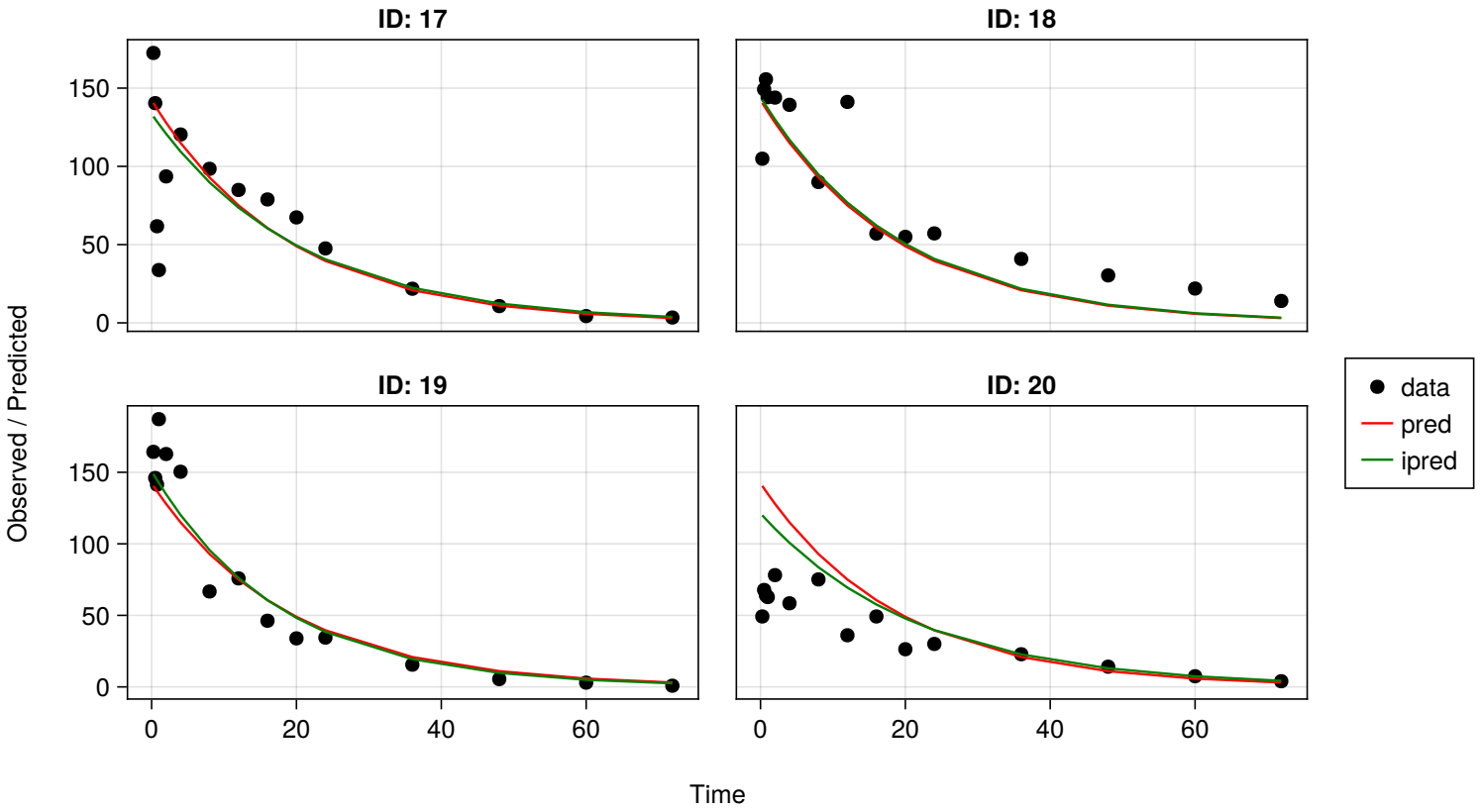

Figure 80: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (5 of 30)

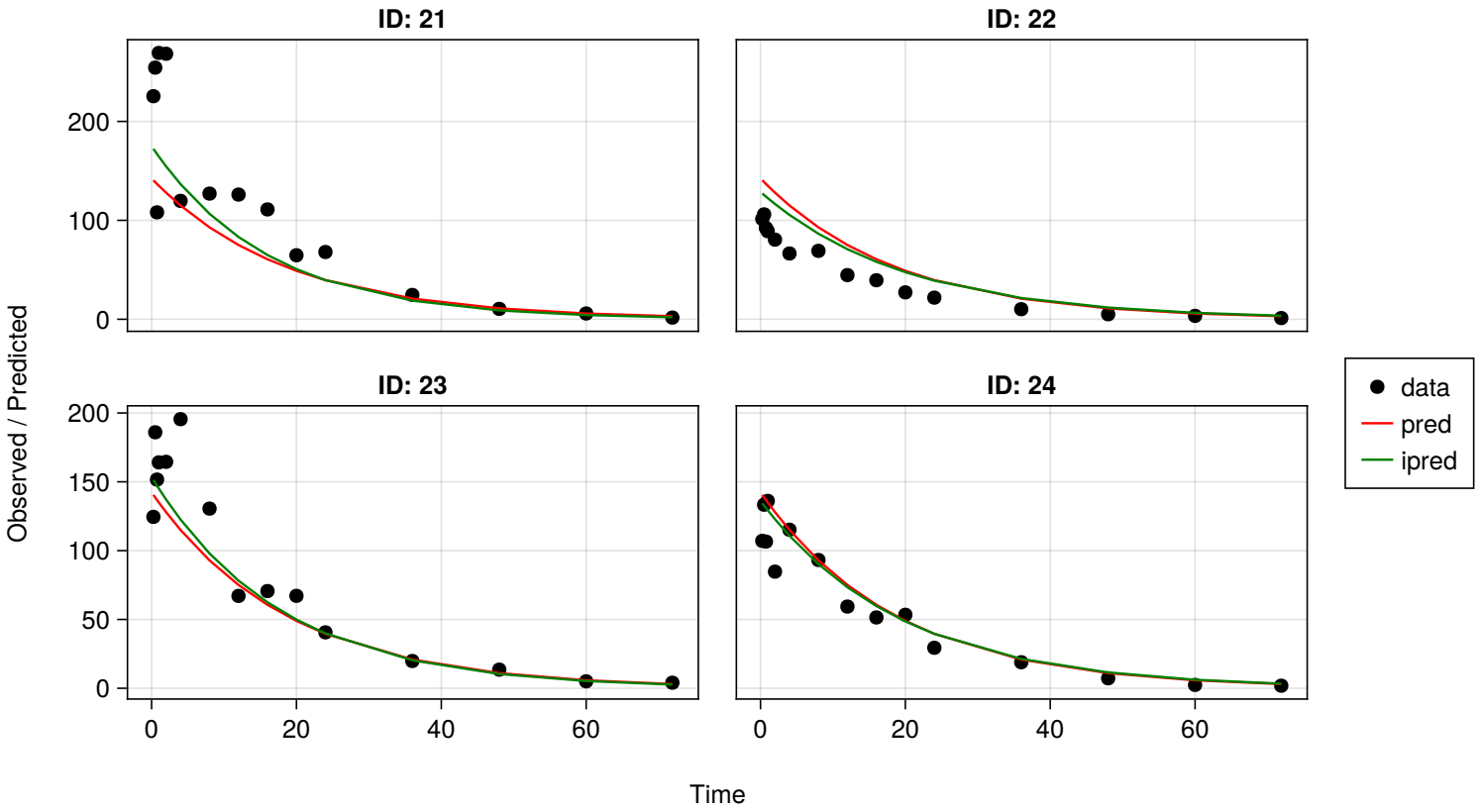

Figure 81: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (6 of 30)

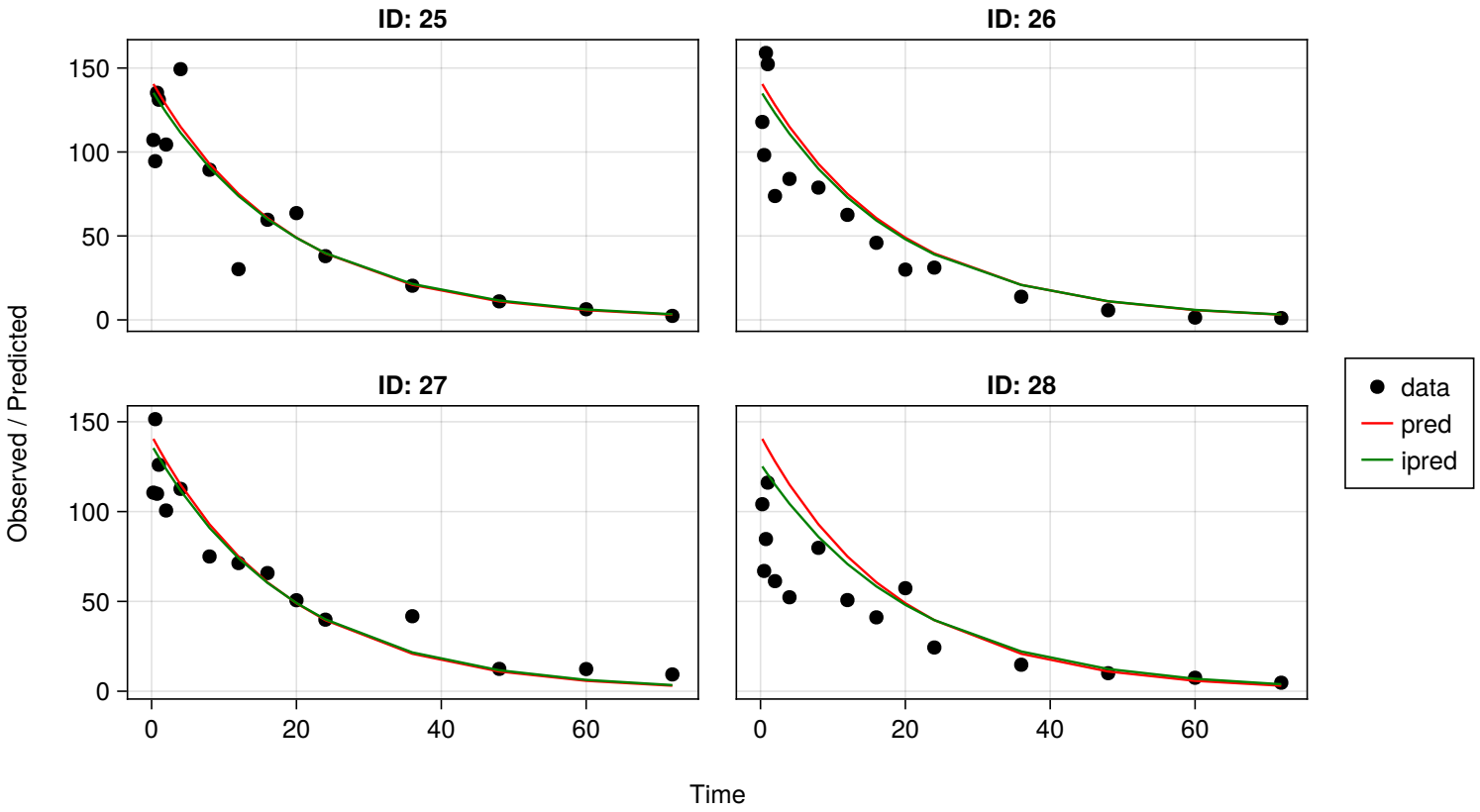

Figure 82: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (7 of 30)

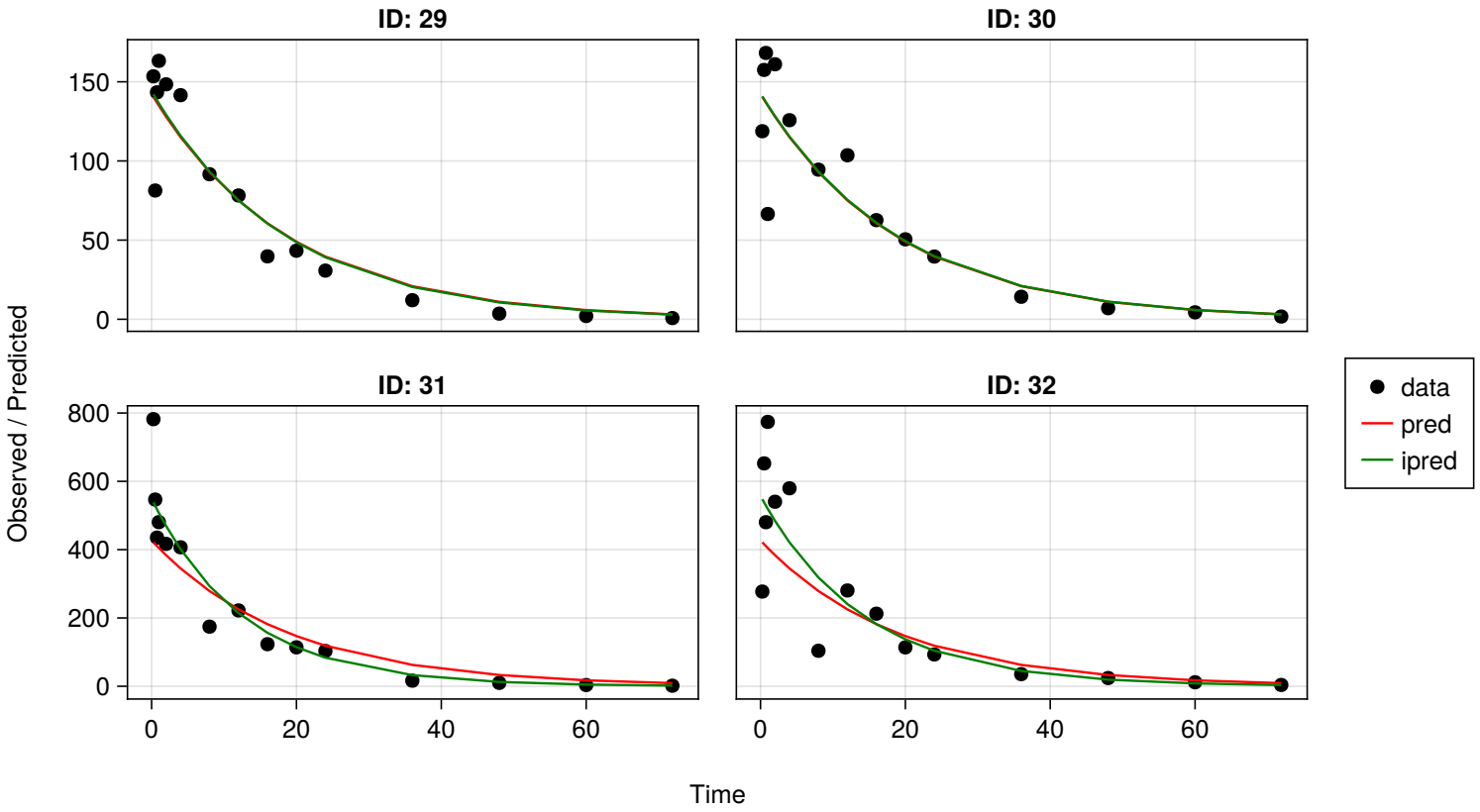

Figure 83: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (8 of 30)

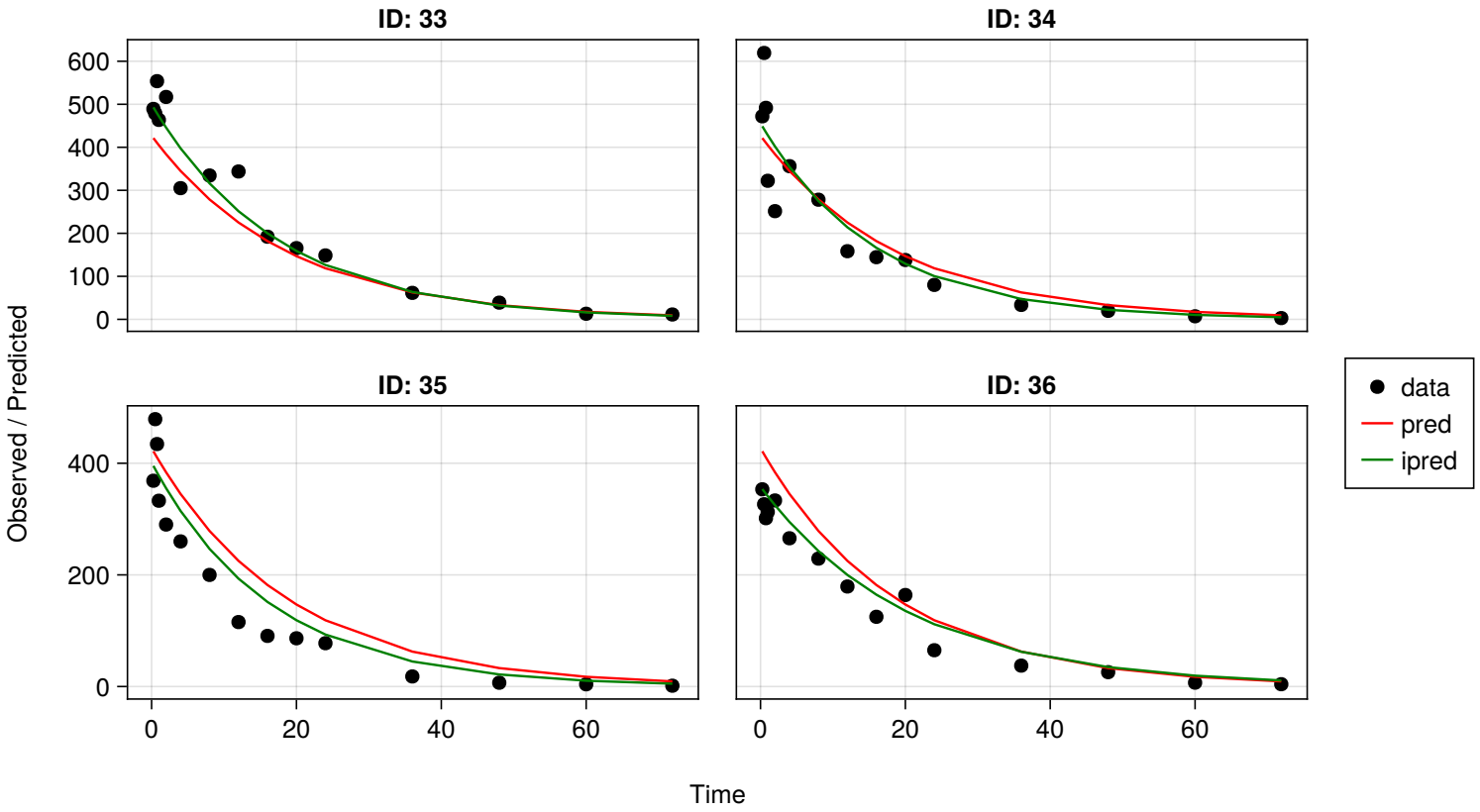

Figure 84: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (9 of 30)

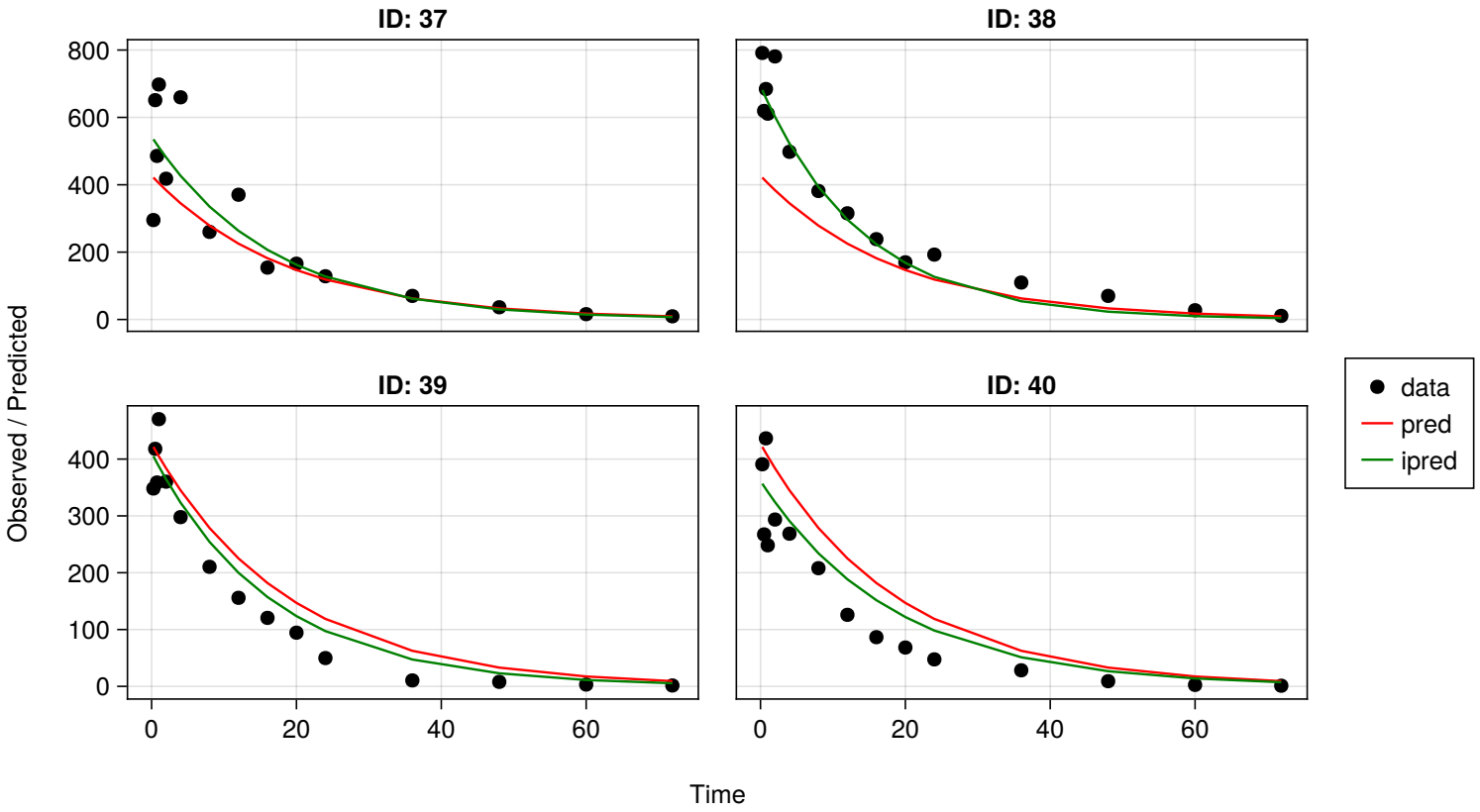

Figure 85: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (10 of 30)

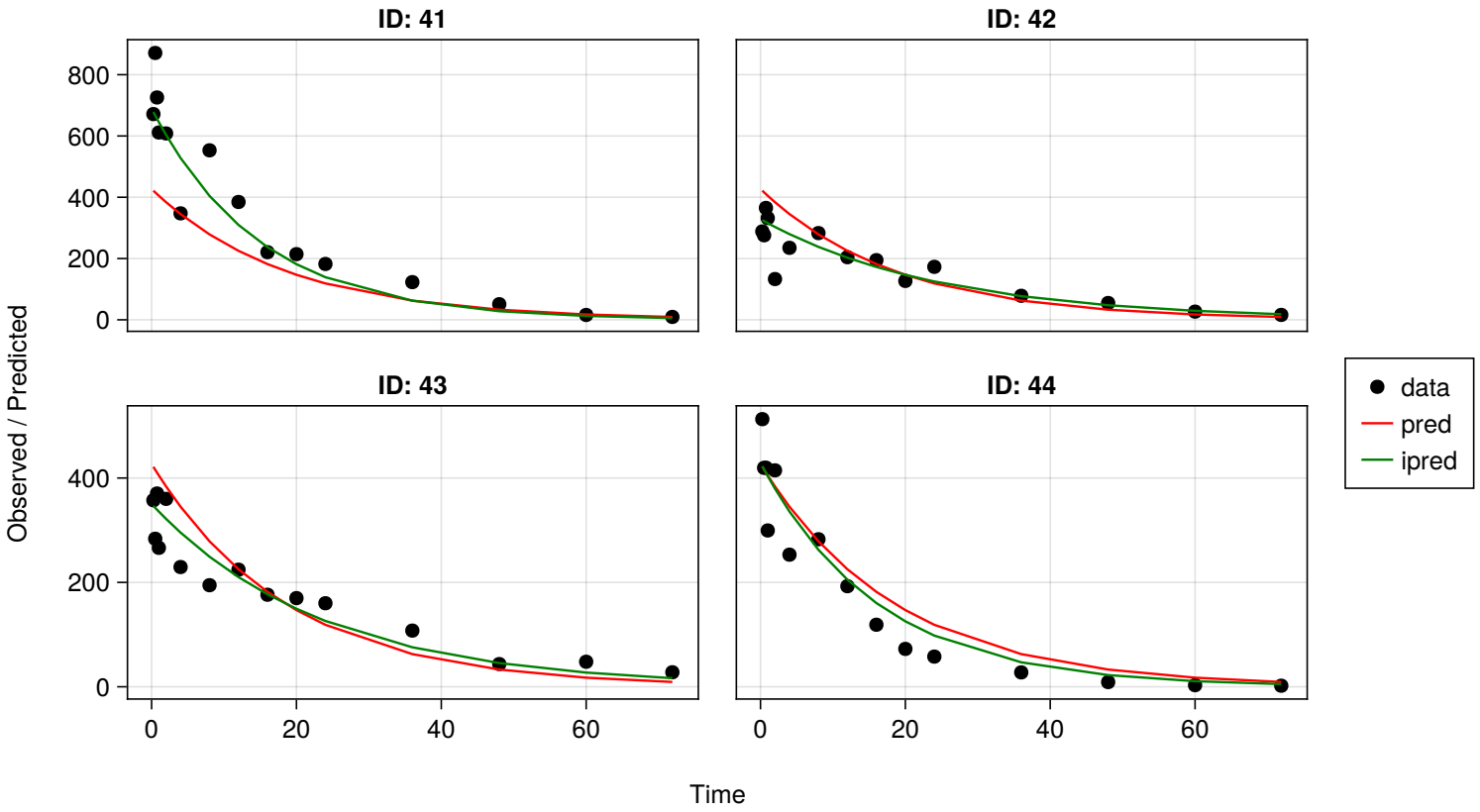

Figure 86: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (11 of 30)

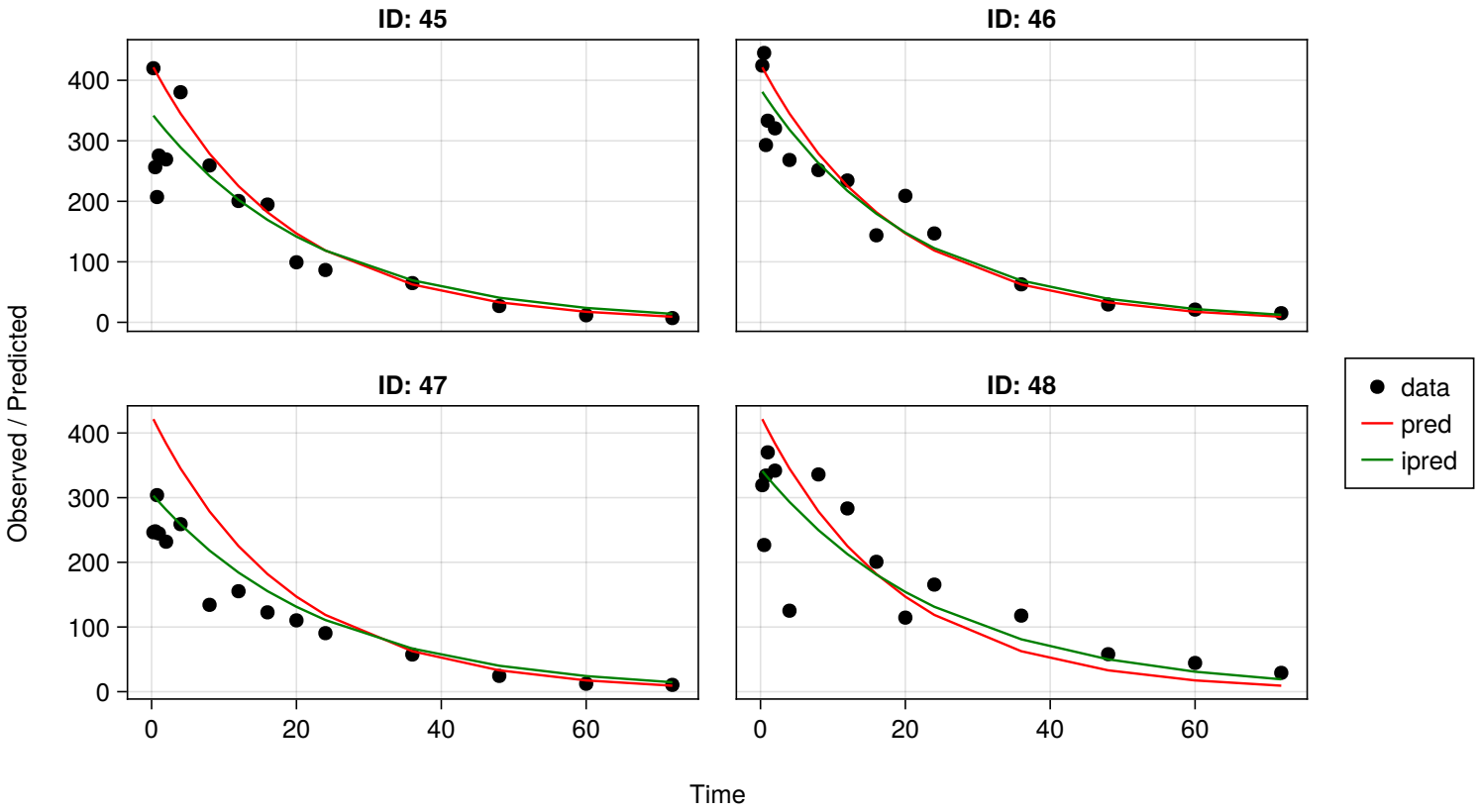

Figure 87: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (12 of 30)

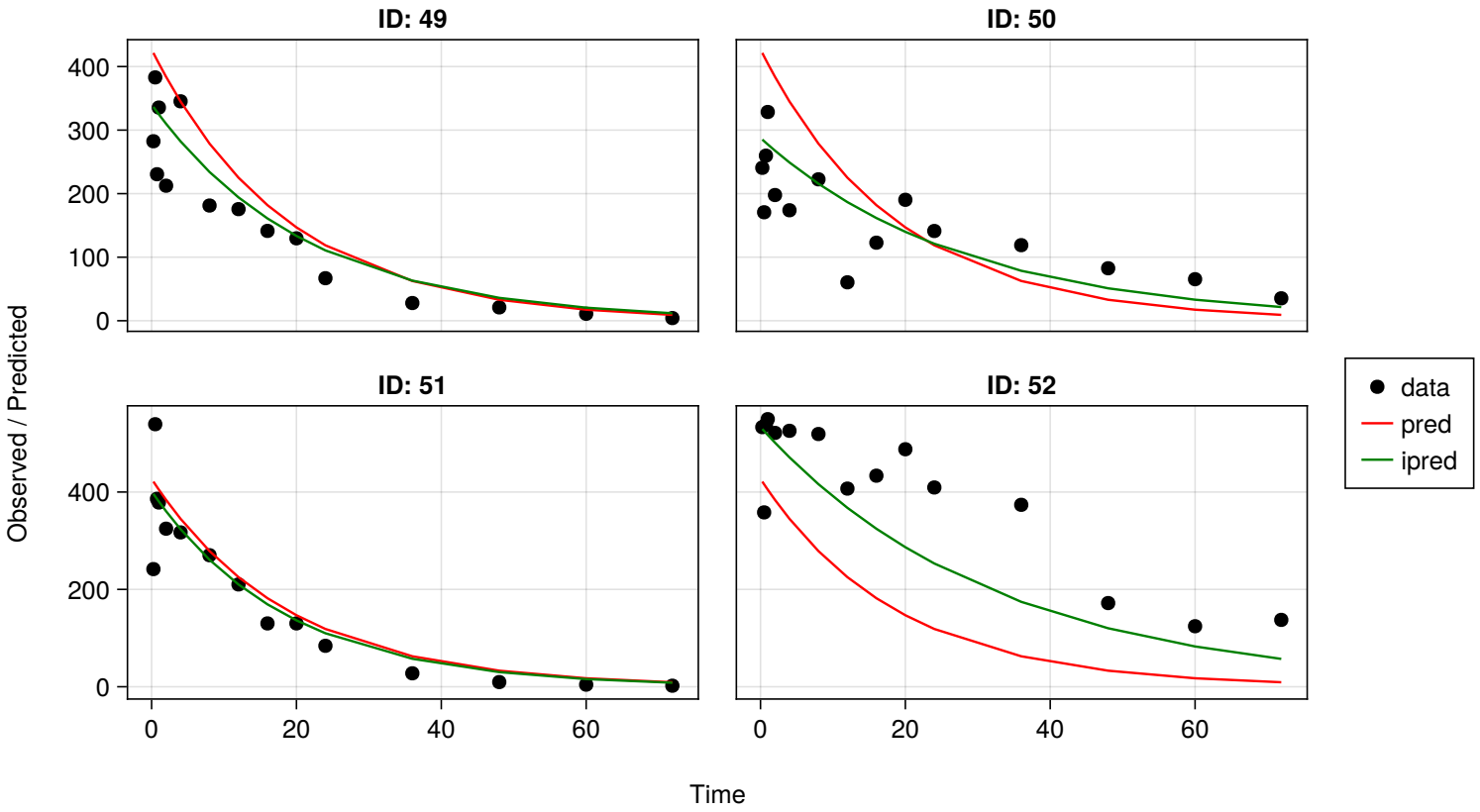

Figure 88: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (13 of 30)

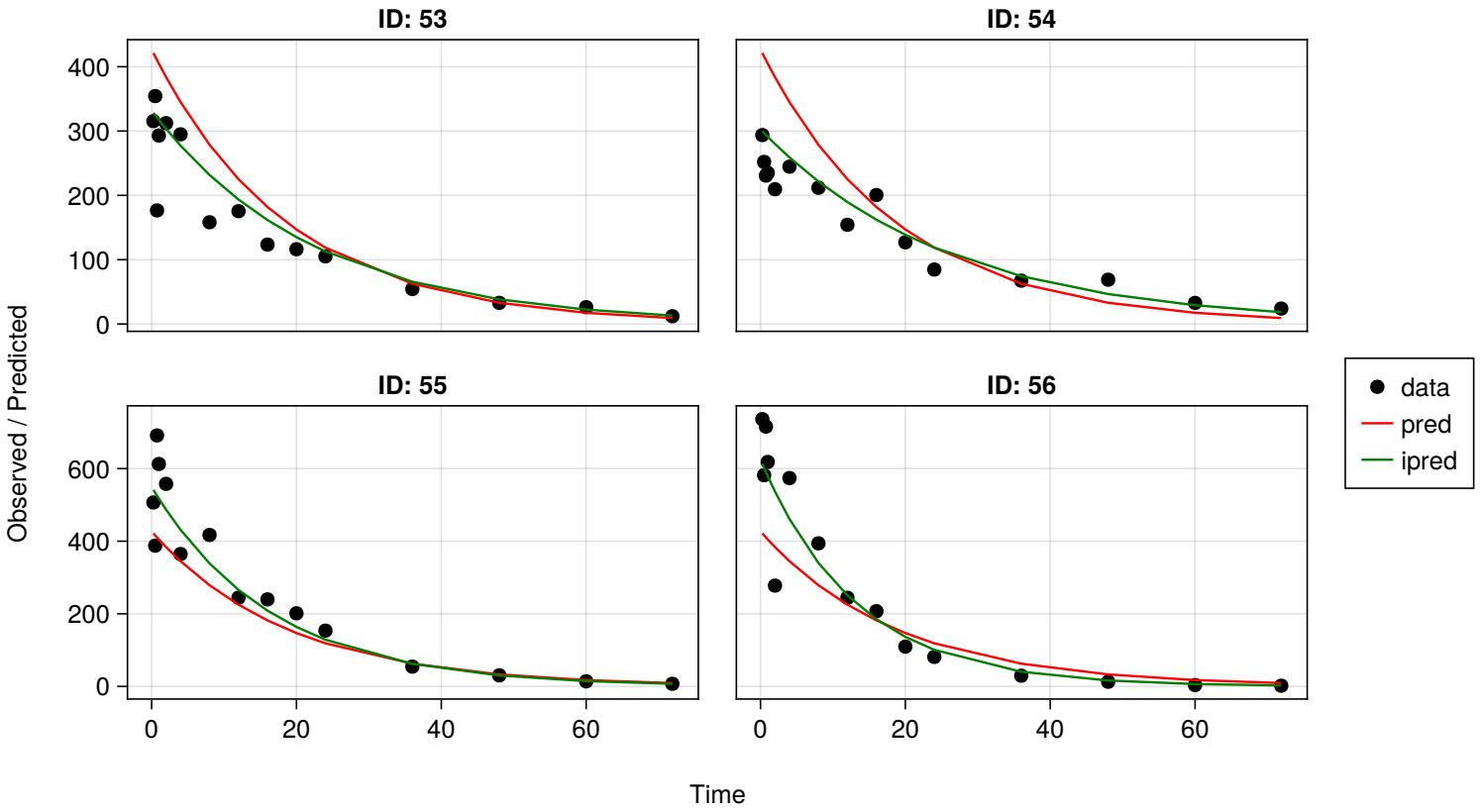

Figure 89: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (14 of 30)

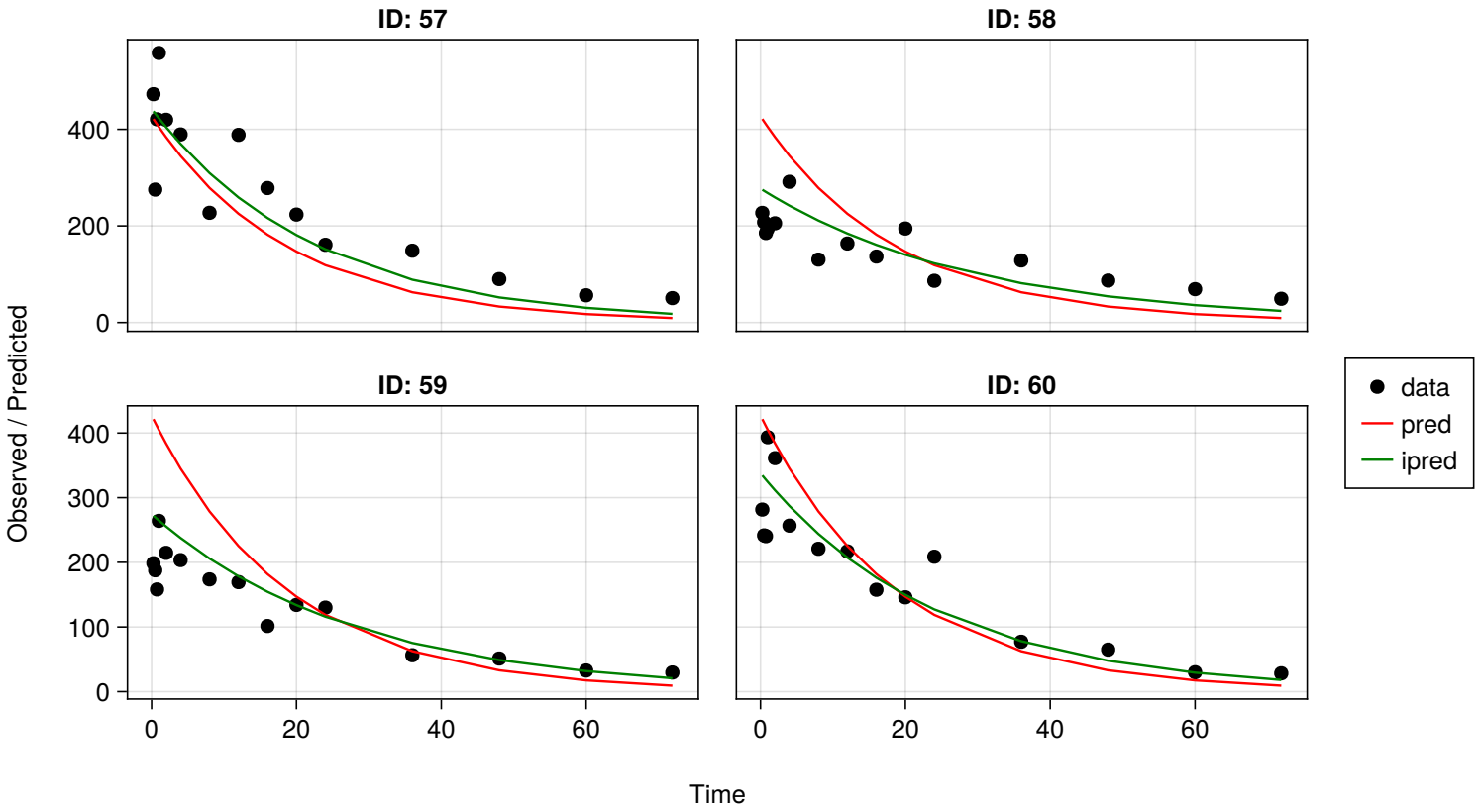

Figure 90: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (15 of 30)

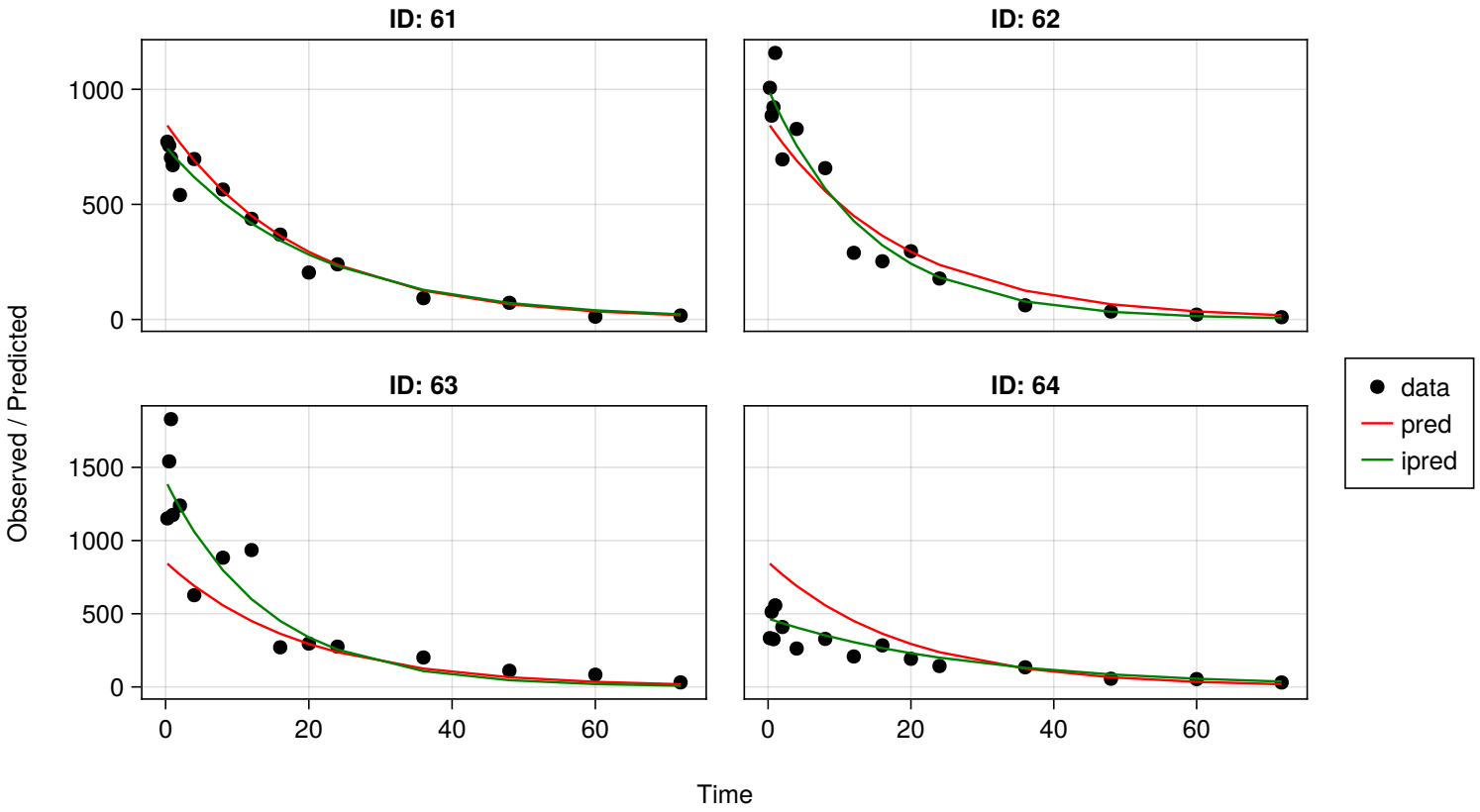

Figure 91: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (16 of 30)

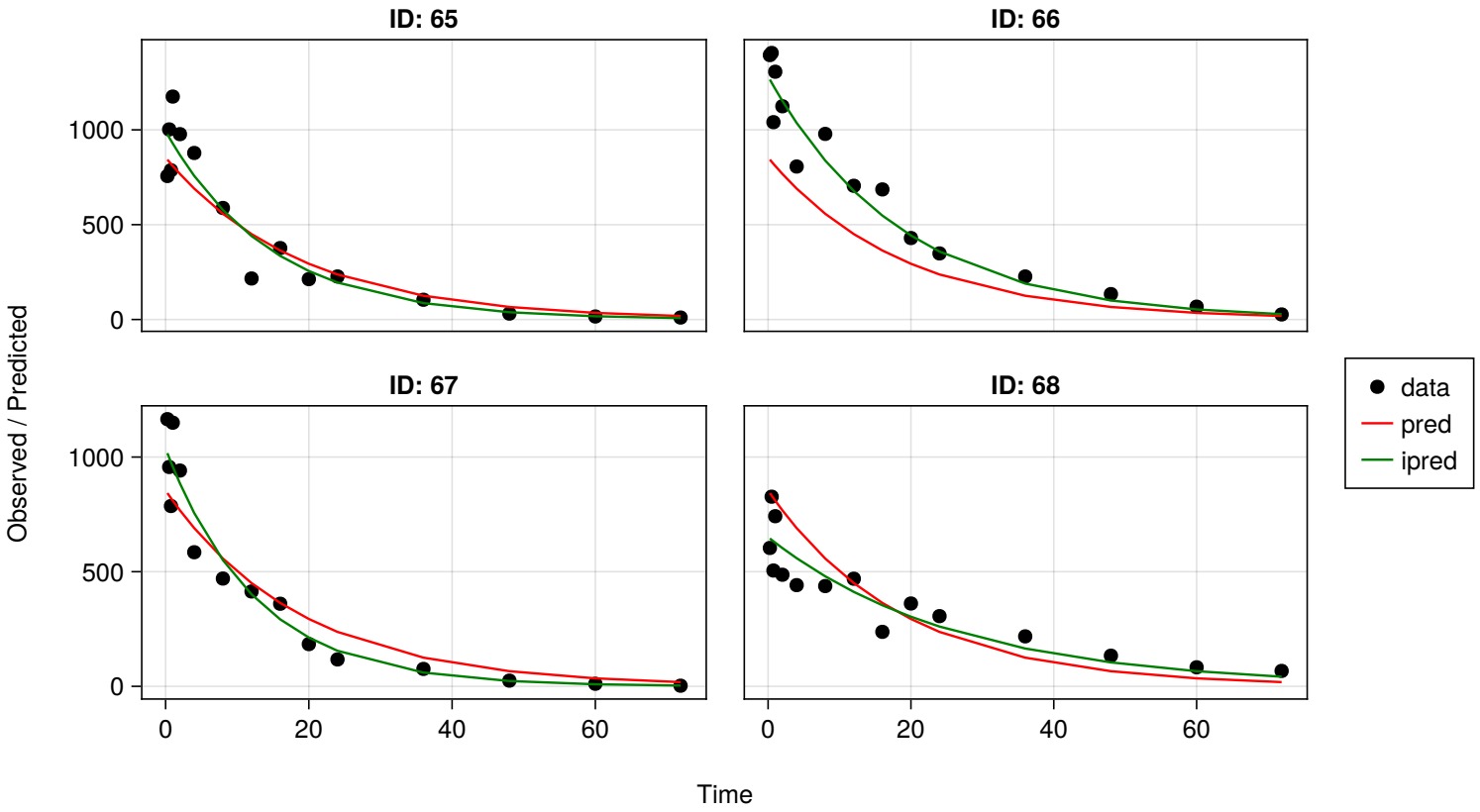

Figure 92: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (17 of 30)

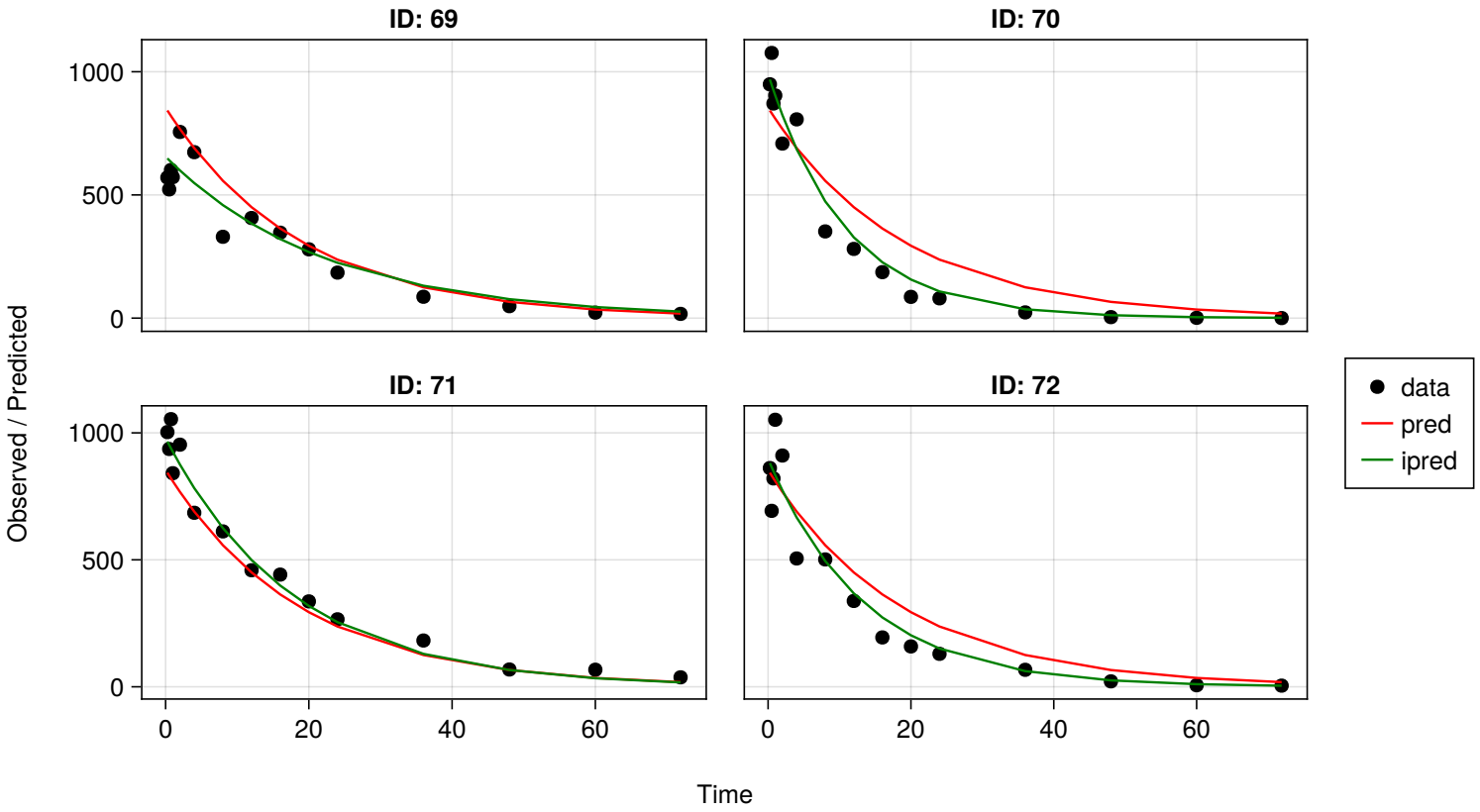

Figure 93: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (18 of 30)

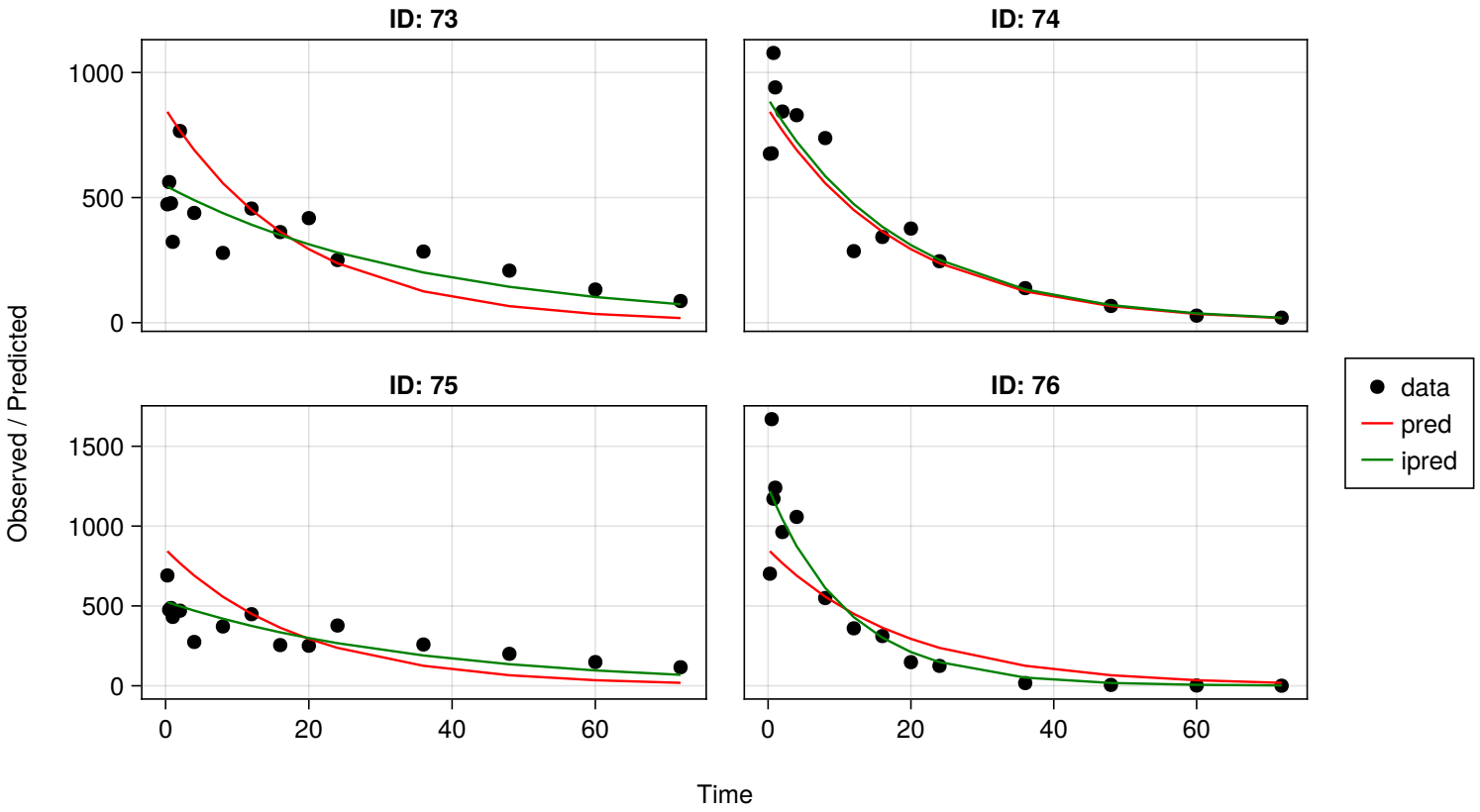

Figure 94: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (19 of 30)

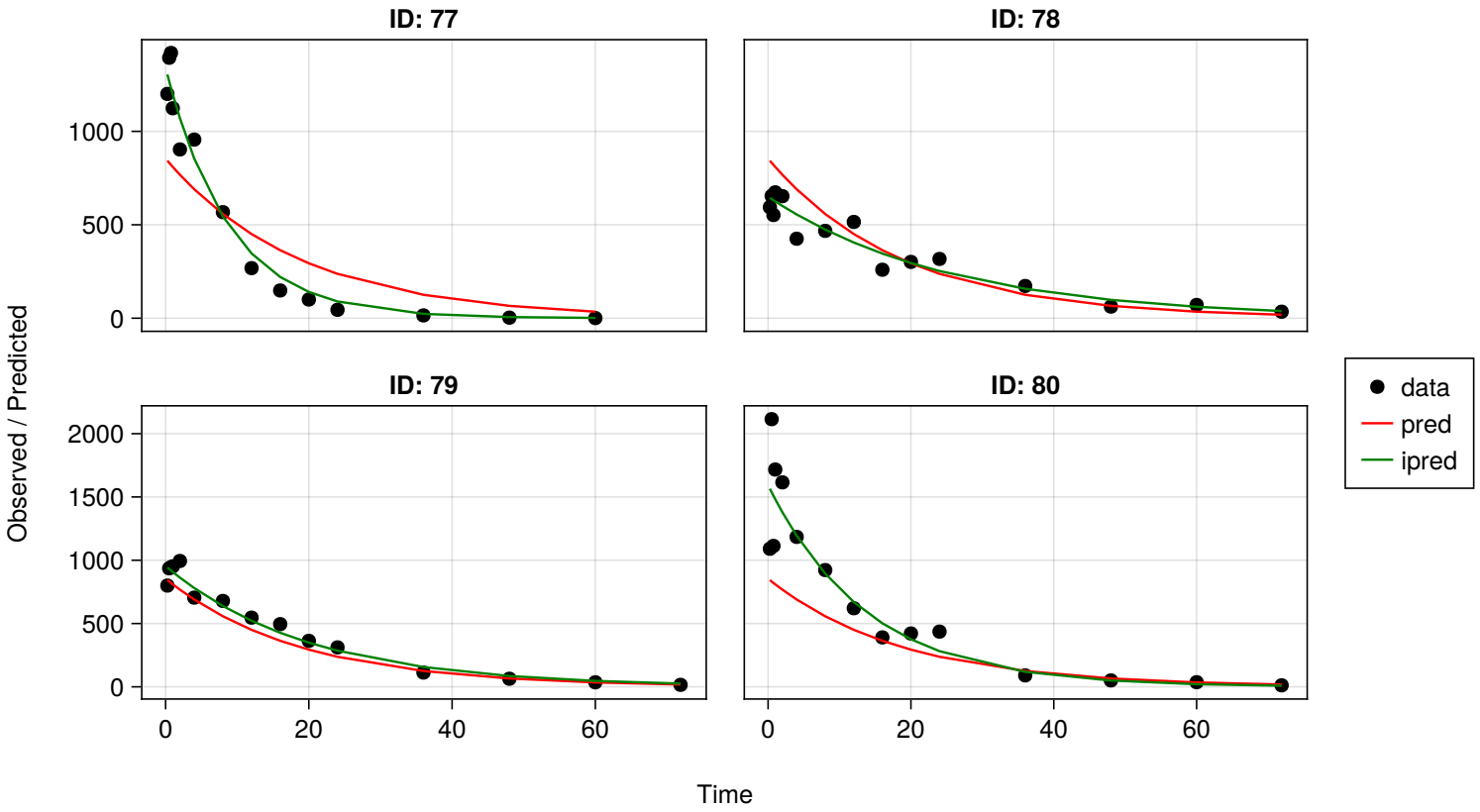

Figure 95: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (20 of 30)

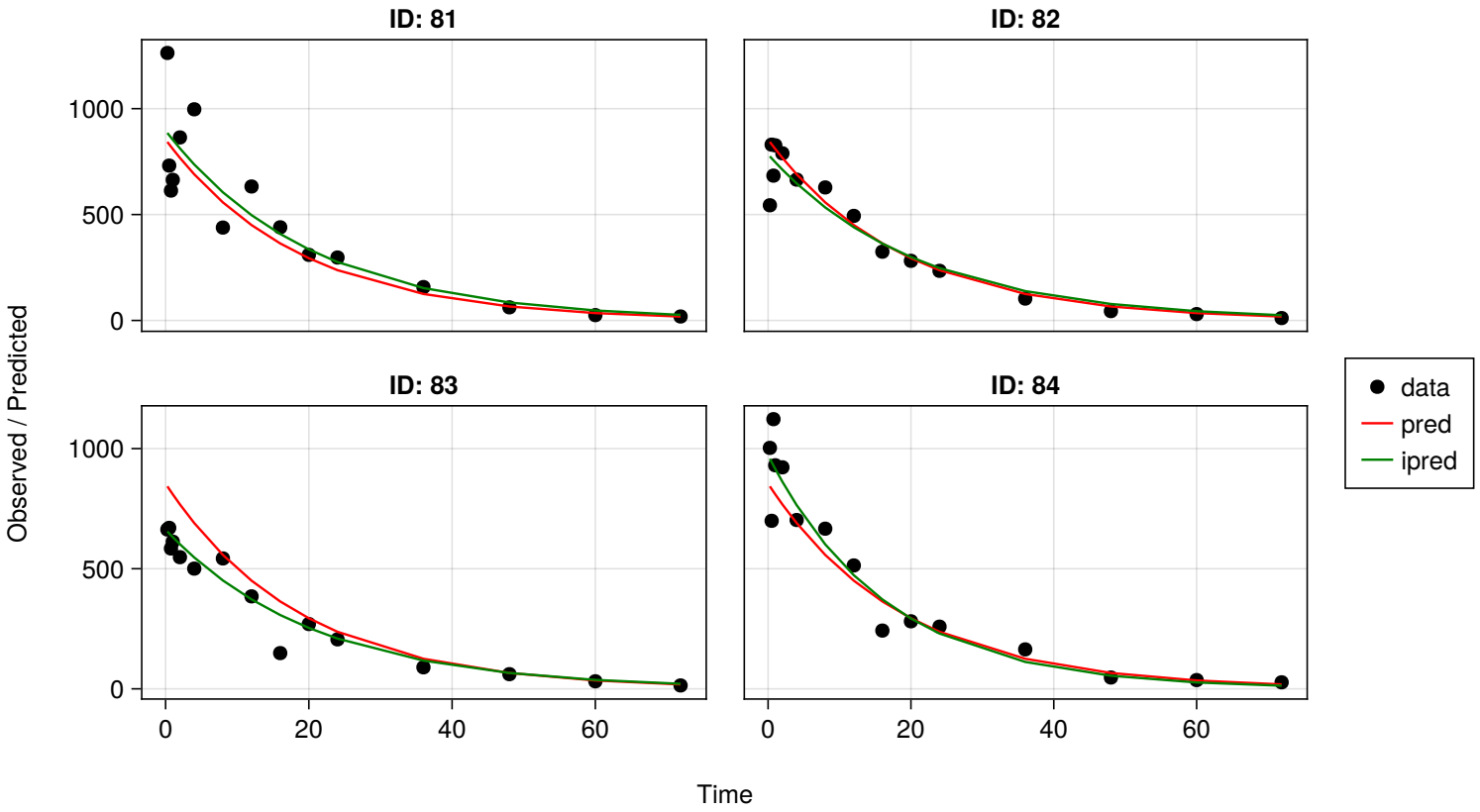

Figure 96: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (21 of 30)

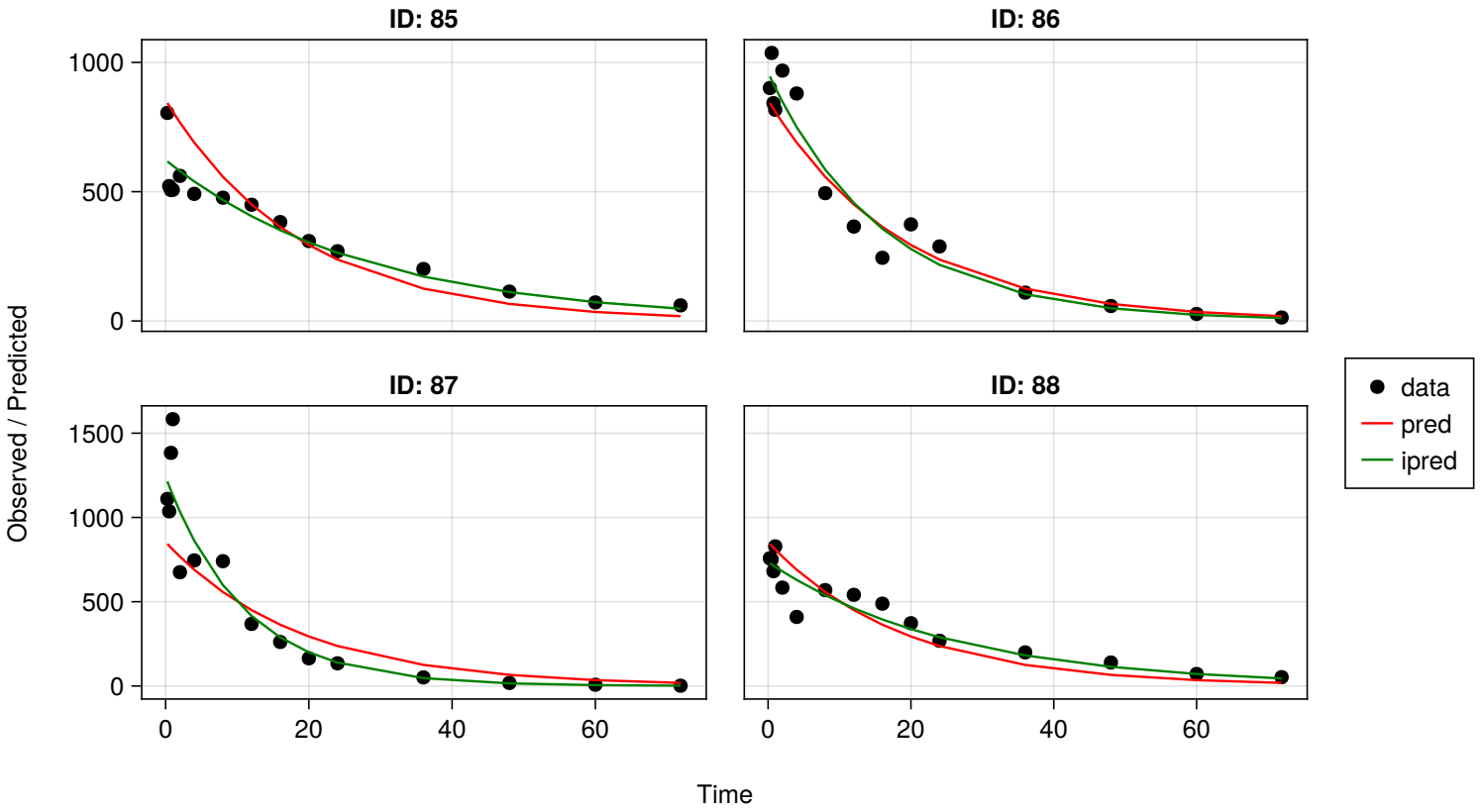

Figure 97: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (22 of 30)

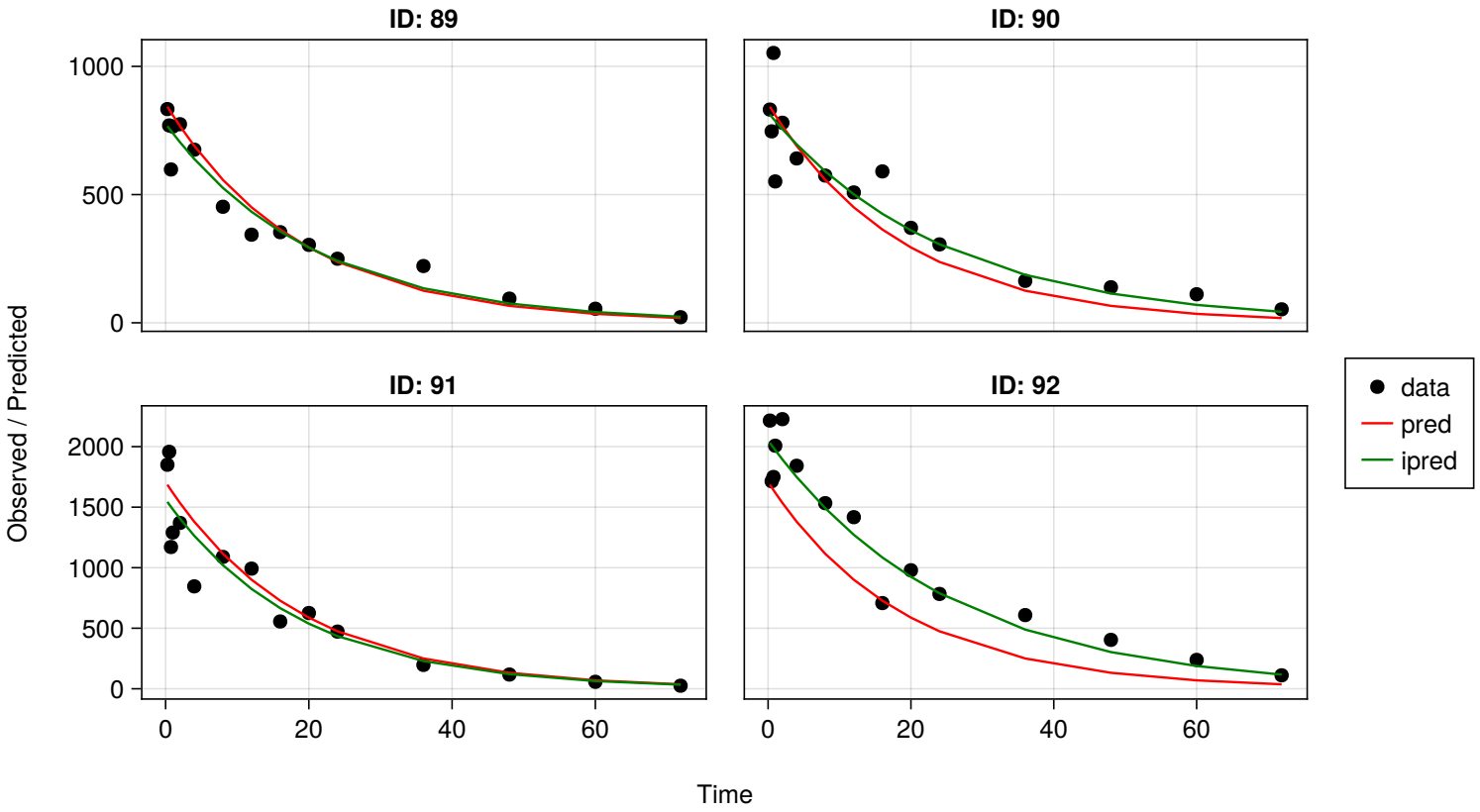

Figure 98: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (23 of 30)

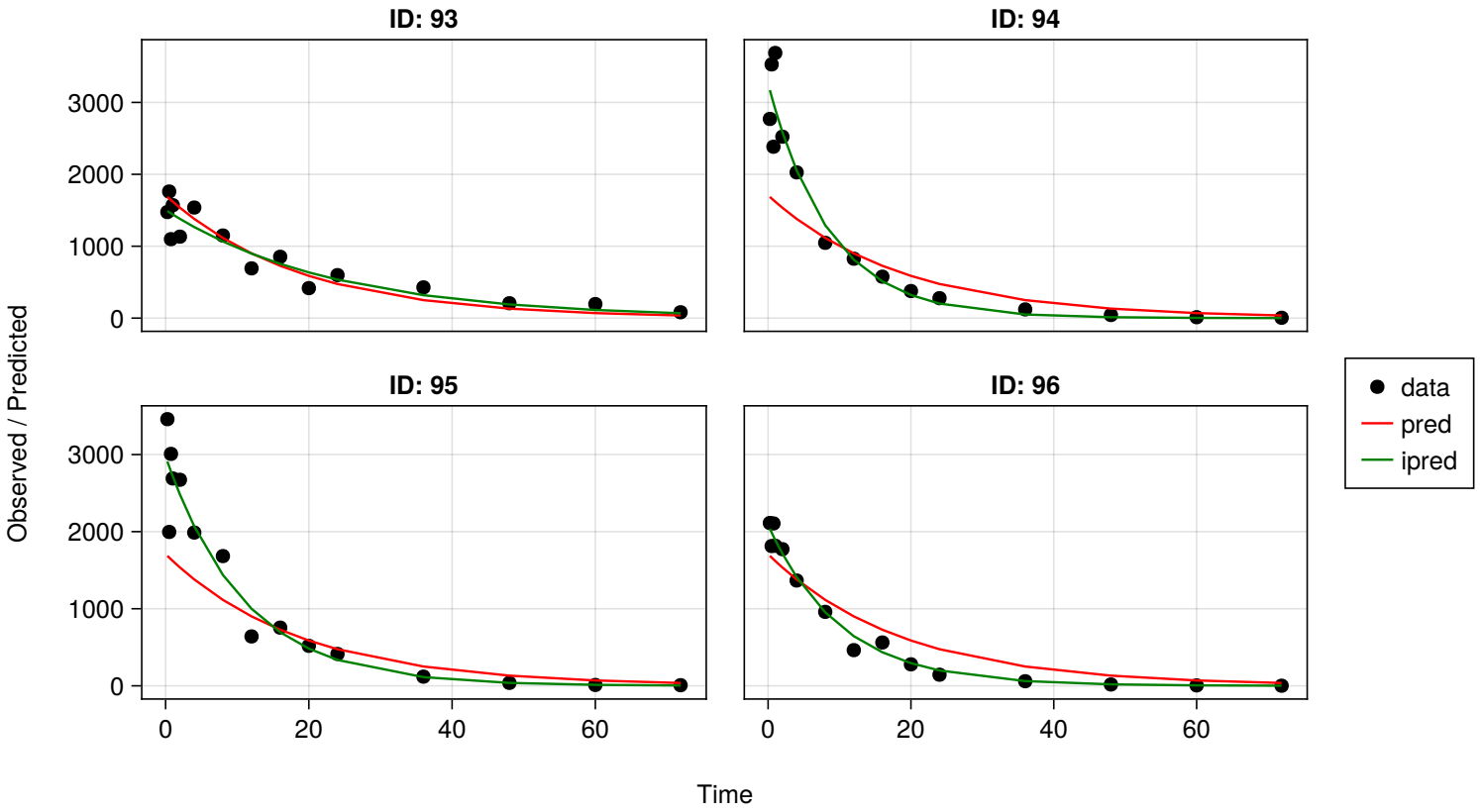

Figure 99: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (24 of 30)

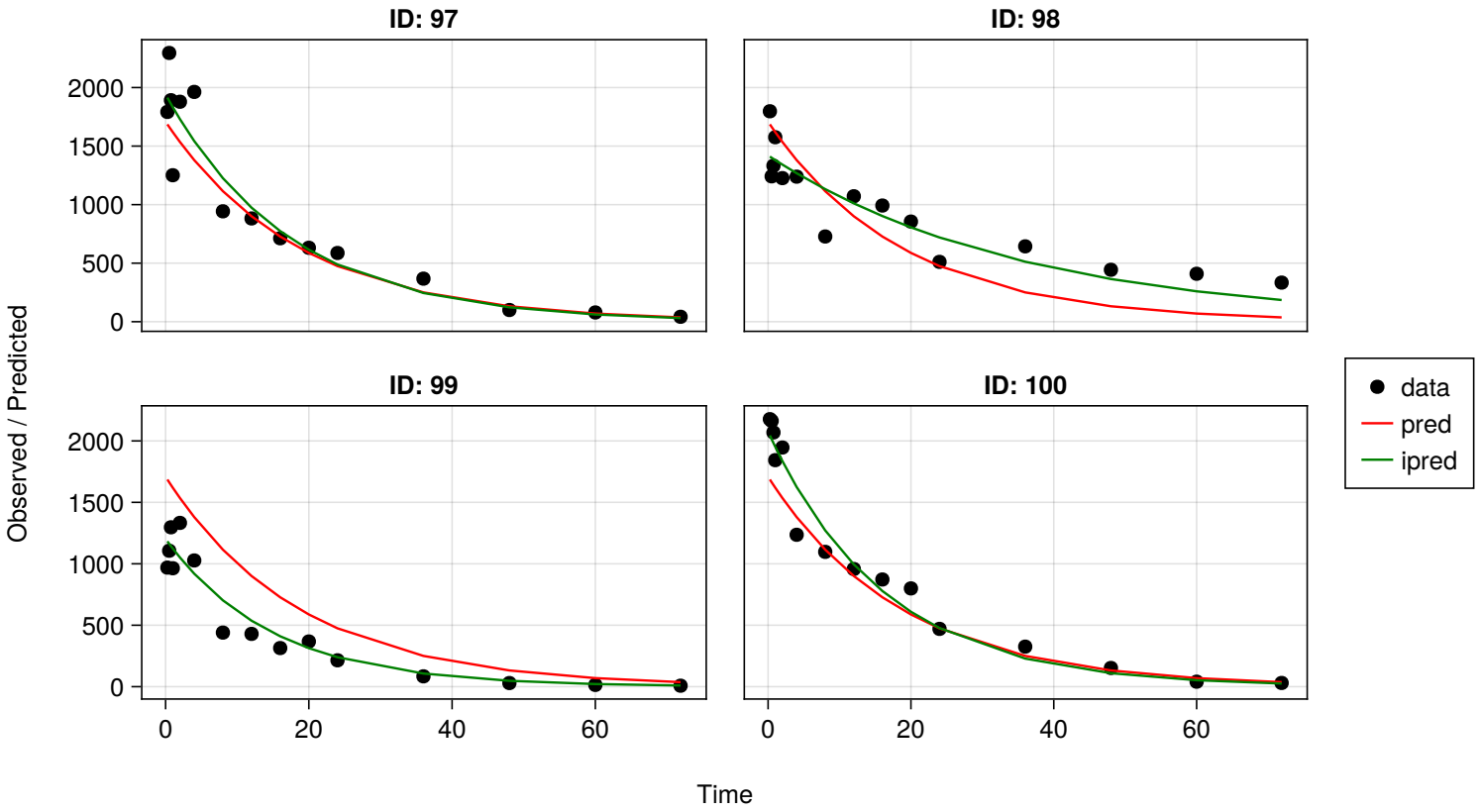

Figure 100: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (25 of 30)

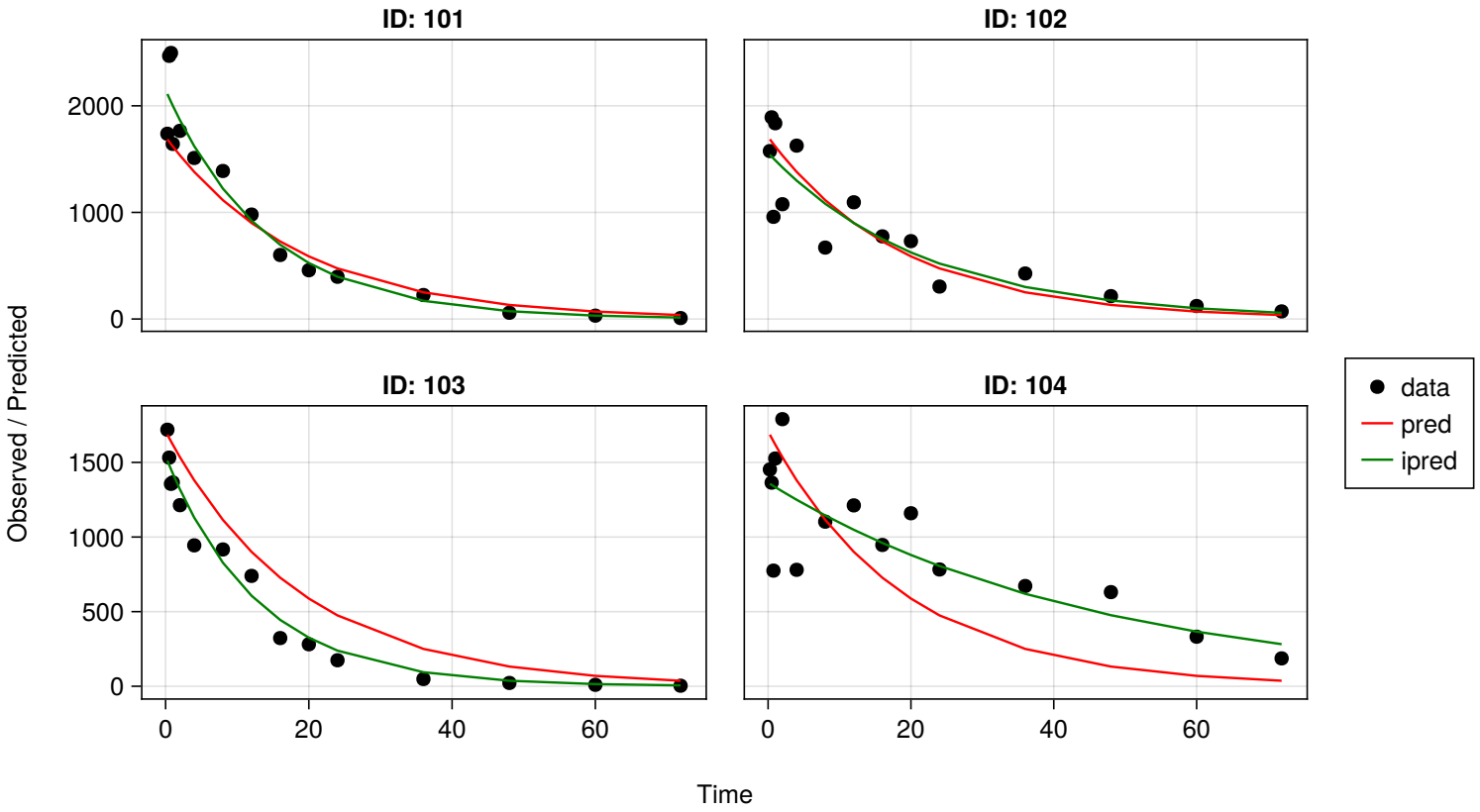

Figure 101: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (26 of 30)

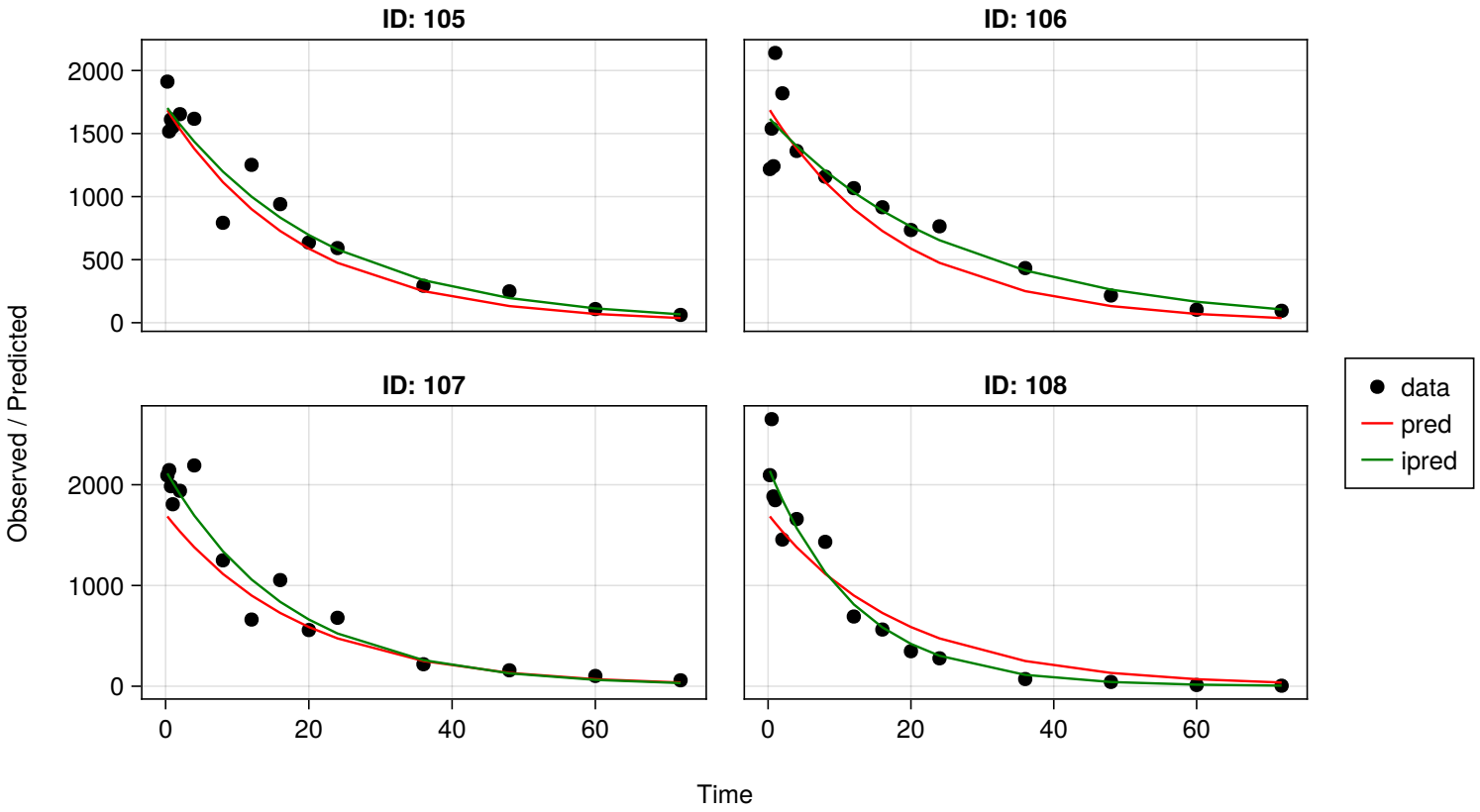

Figure 102: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (27 of 30)

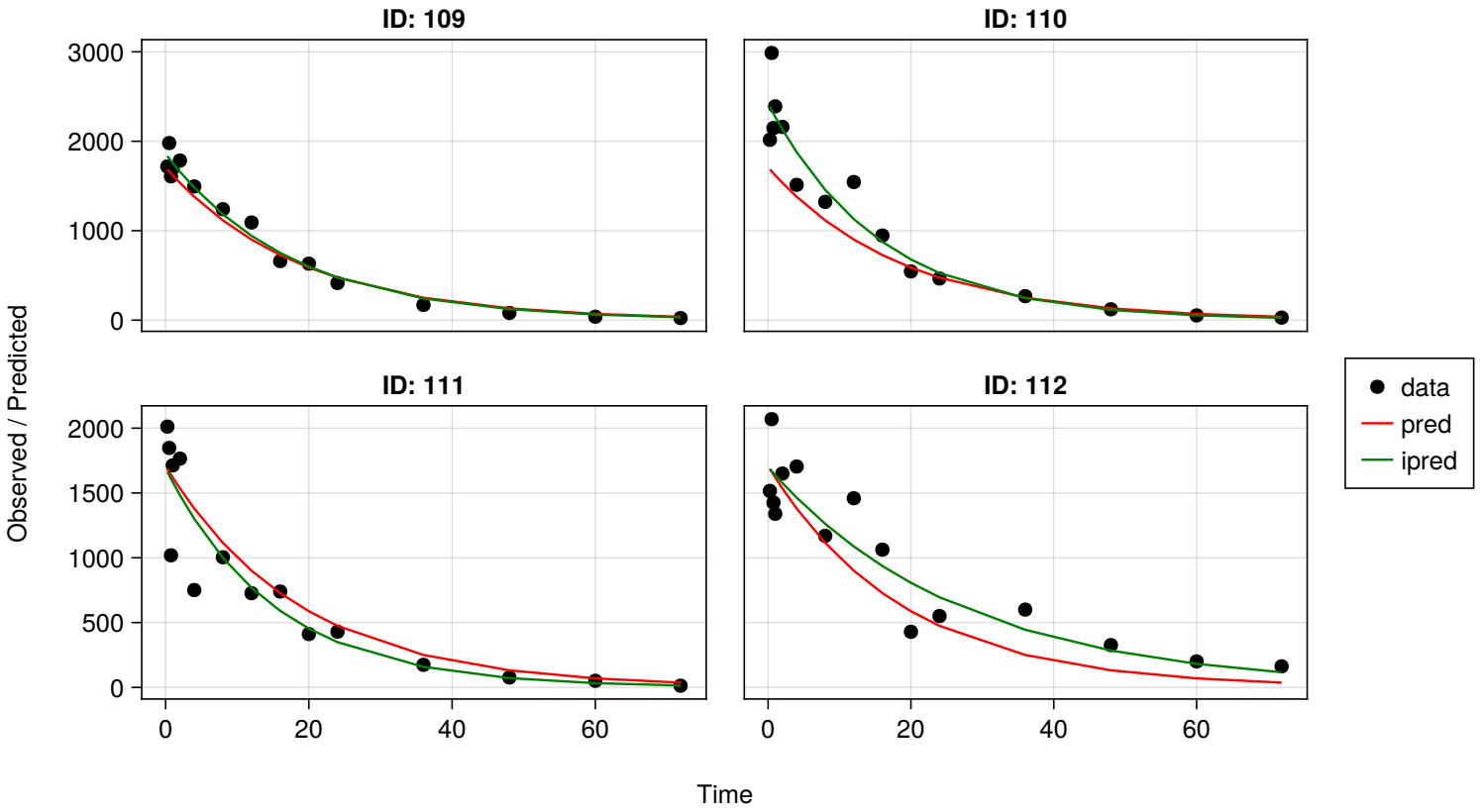

Figure 103: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (28 of 30)

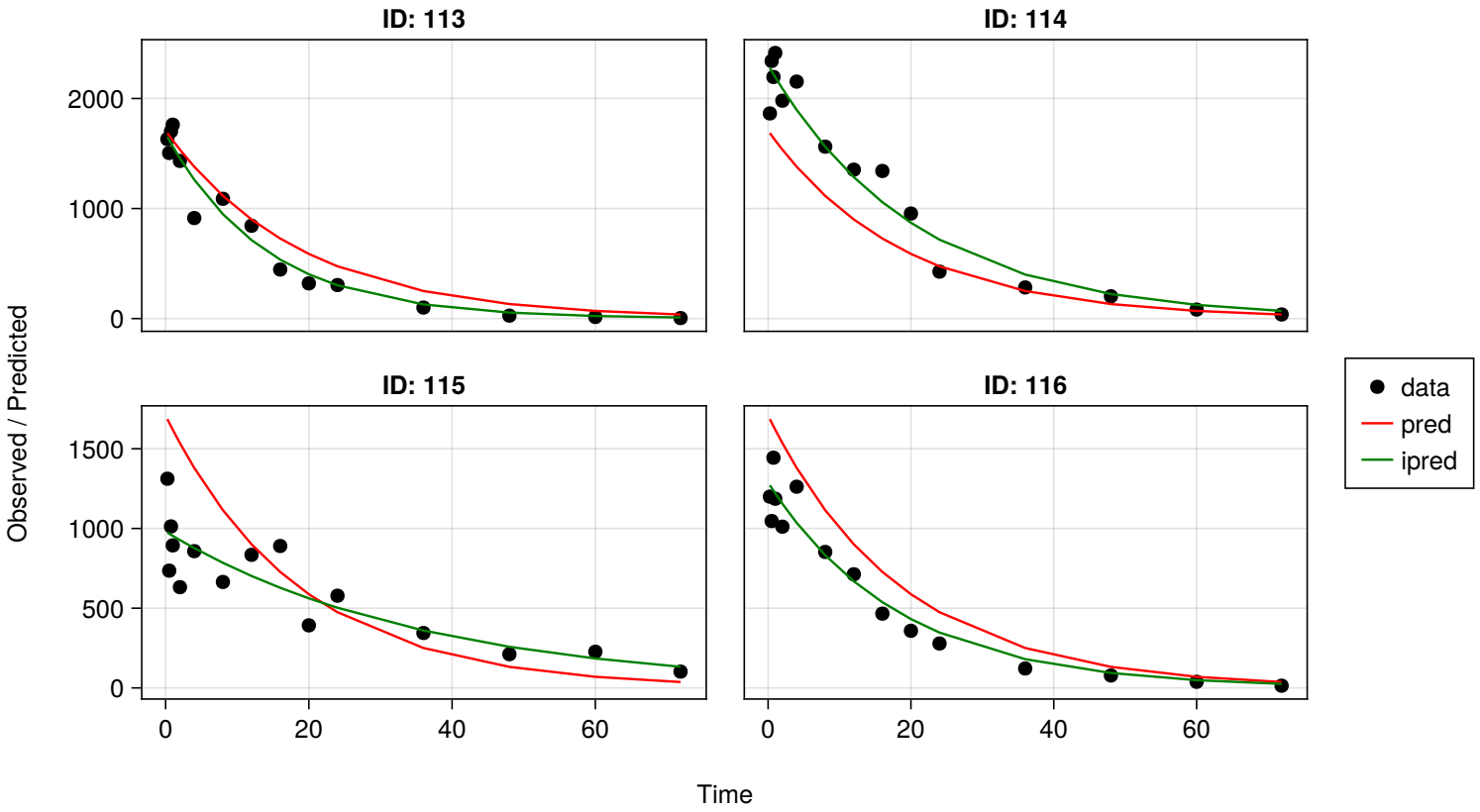

Figure 104: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (29 of 30)

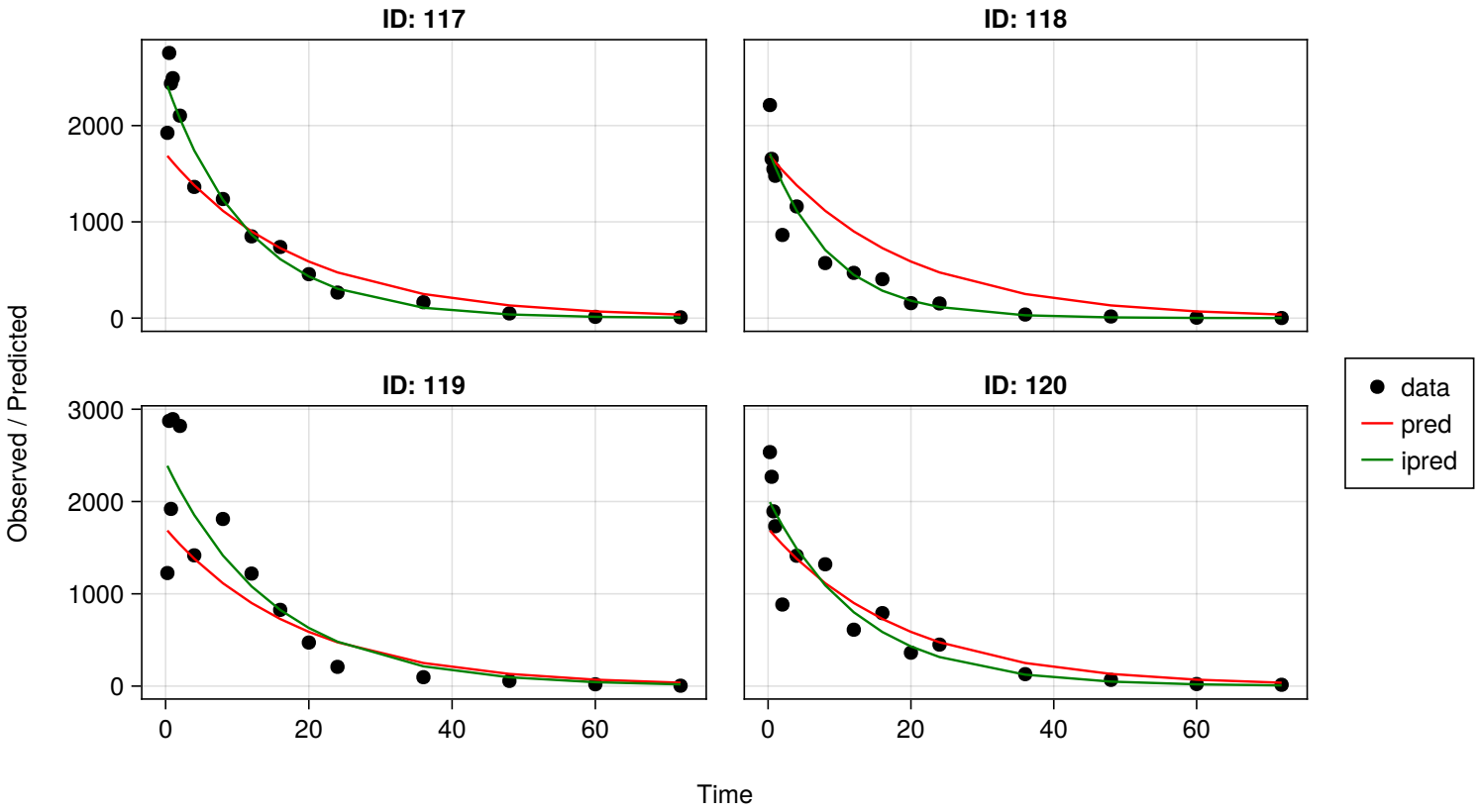

Figure 105: LaplaceI: Population and individual predictions overlaid over observations for Observed (dv) by ID (30 of 30)

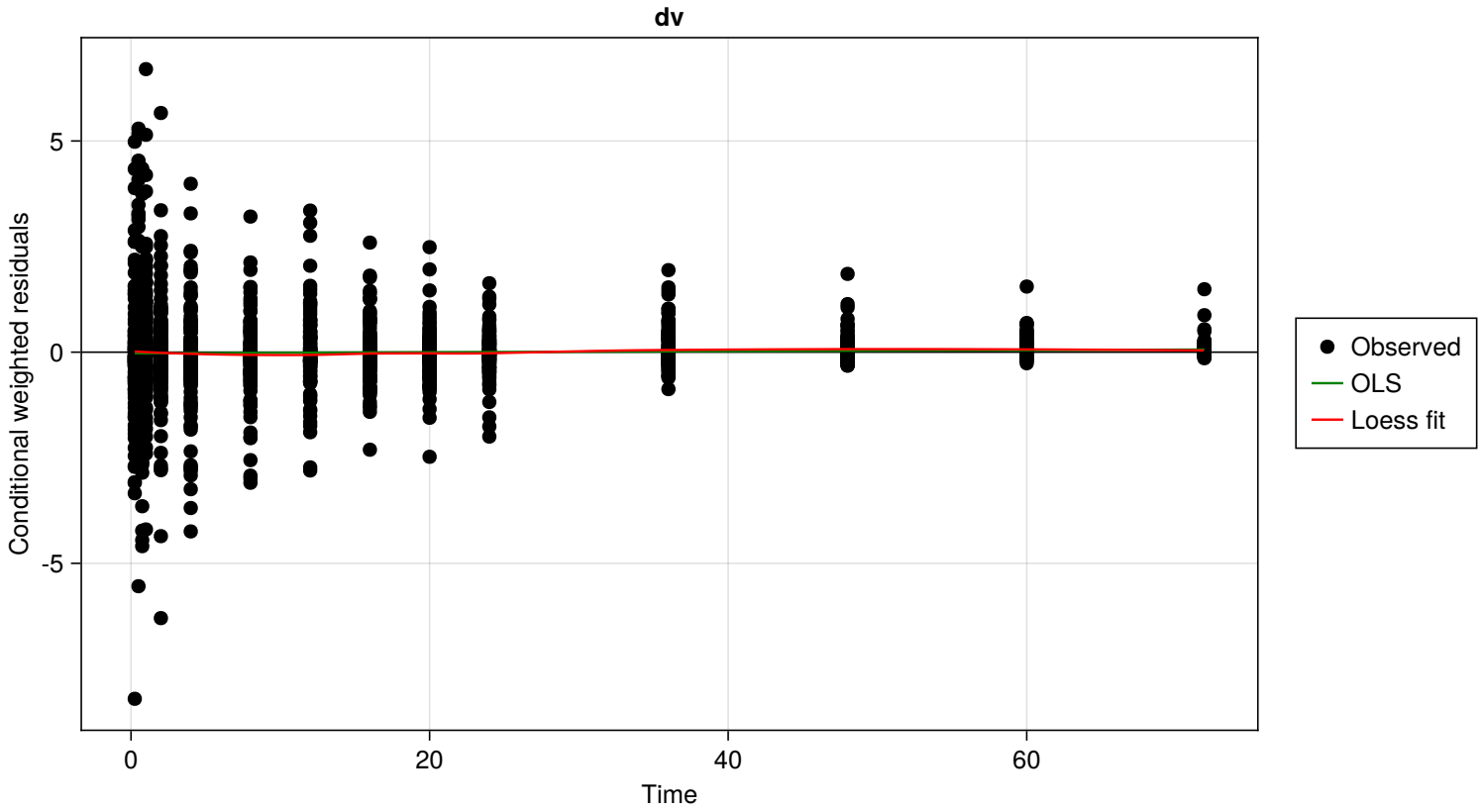

Figure 106: LaplaceI: Conditional weighted residuals Observed (dv) vs Time (1 of 1)

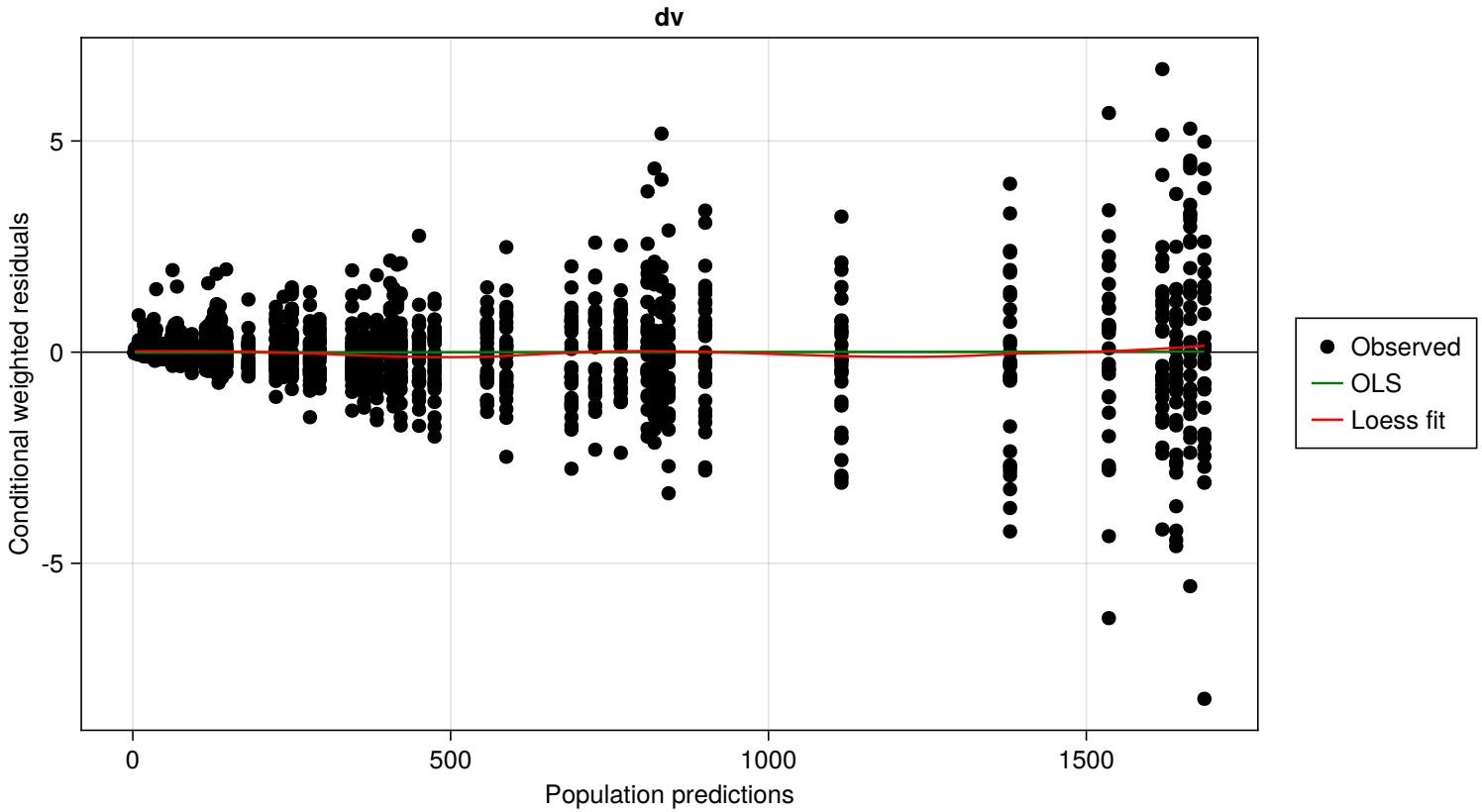

Figure 107: LaplaceI: Conditional weighted residuals Observed (dv) vs predictions (1 of 1)

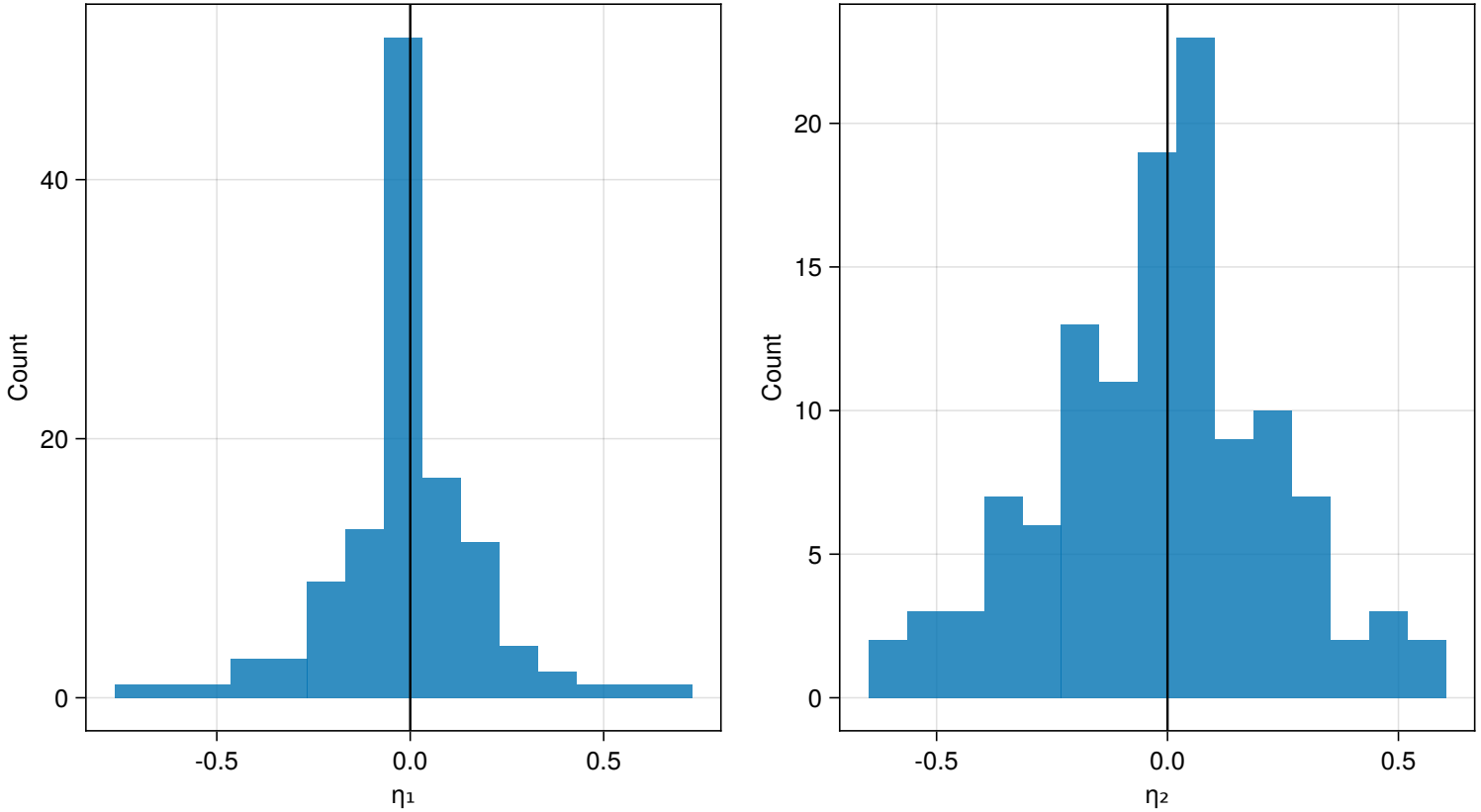

Figure 108: LaplaceI: Distribution of random effects (1 of 1)

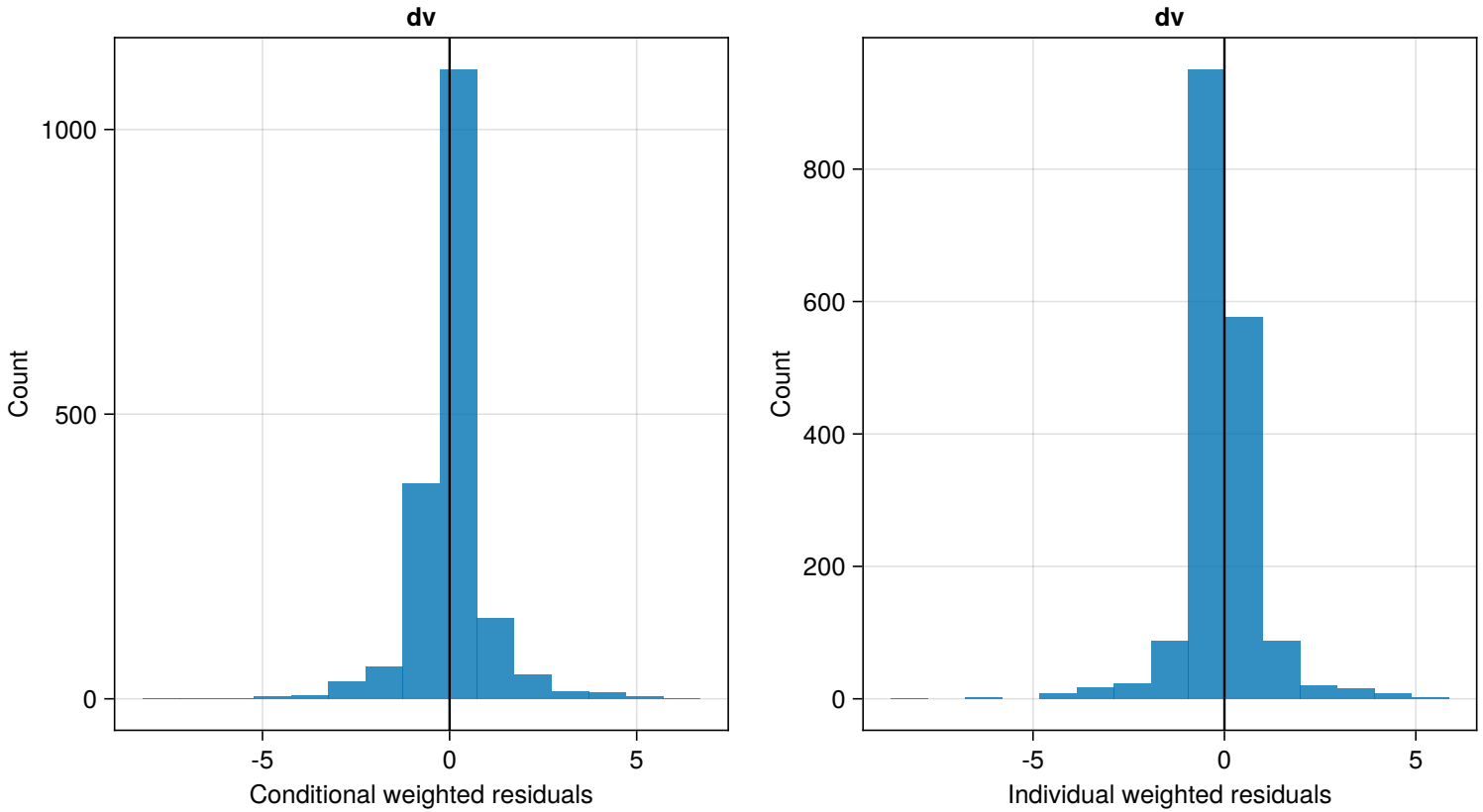

Figure 109: LaplaceI: Distribution of weighted residuals Observed (dv) (1 of 1)

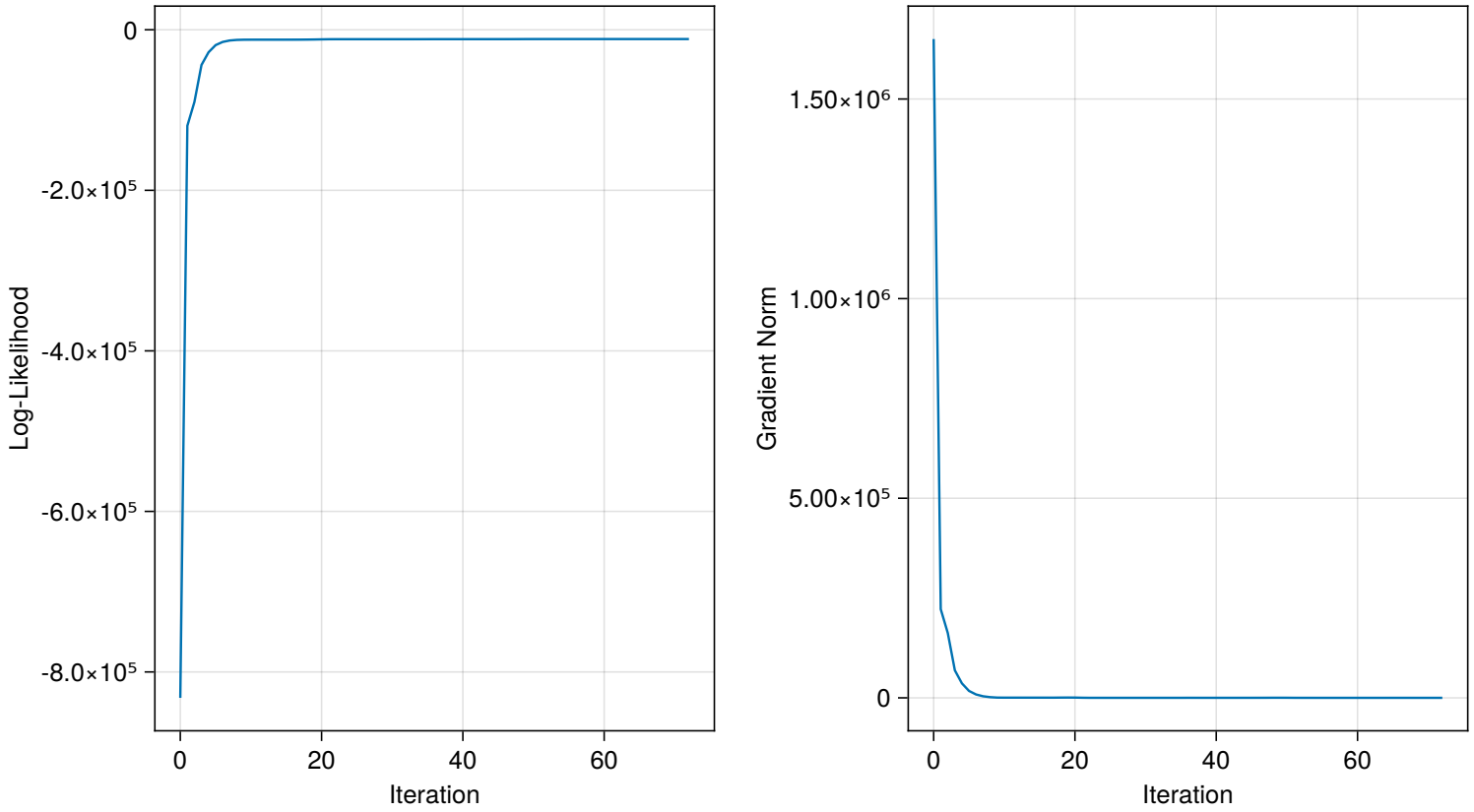

Figure 110: LaplaceI: Traceplot of loglikelihood and gradient norm (1 of 1)

6.4 NaivePooled

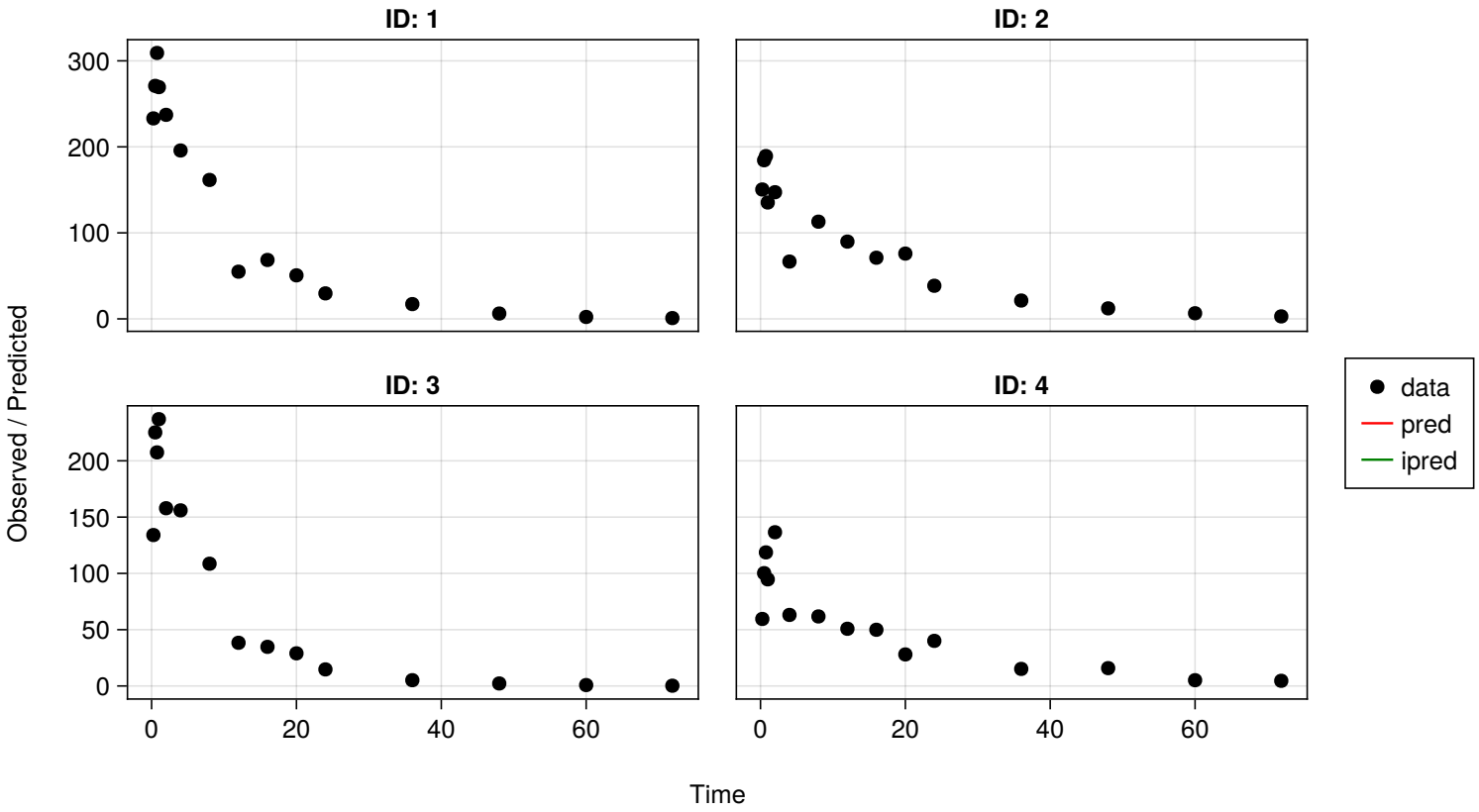

Figure 111: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (1 of 30)

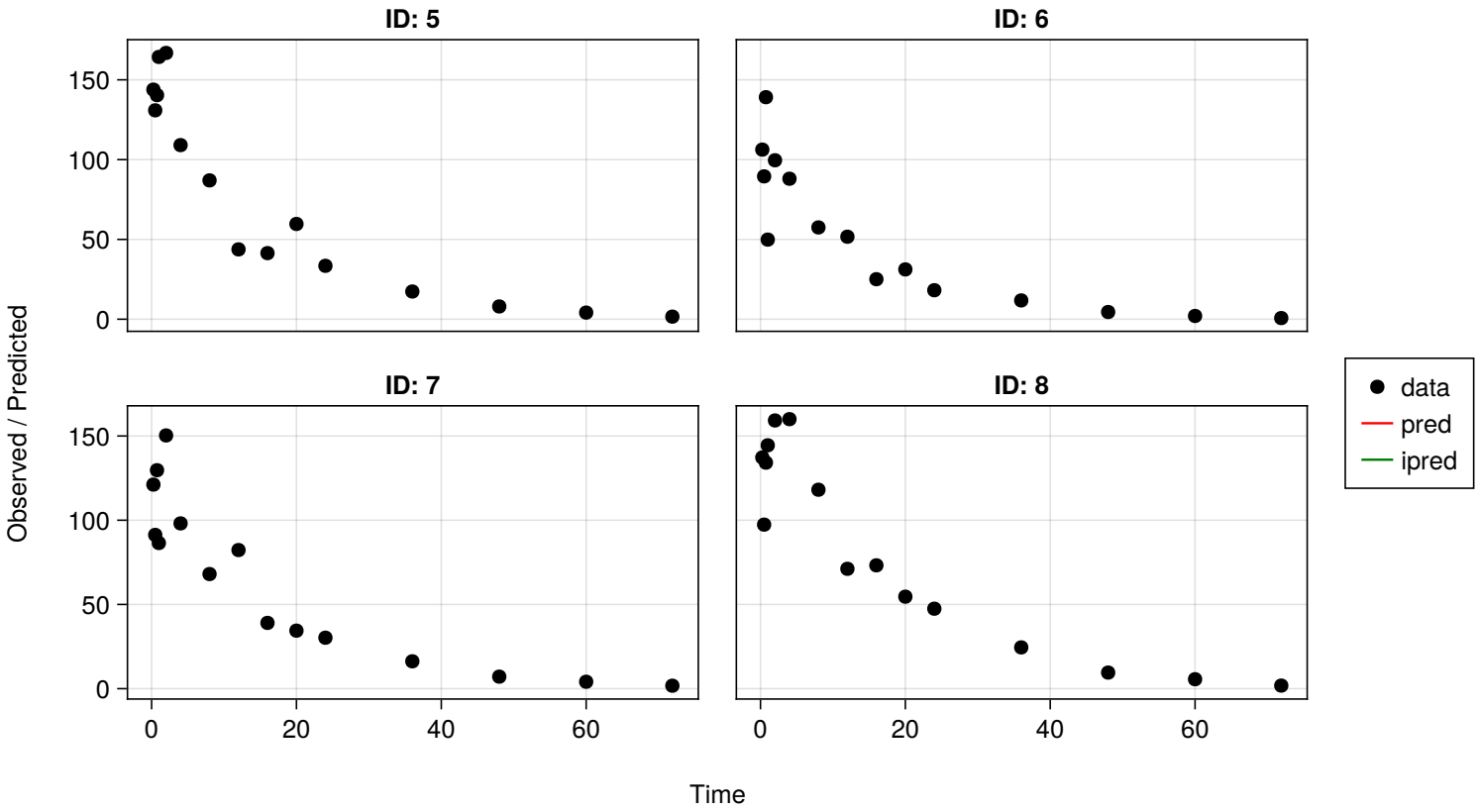

Figure 112: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (2 of 30)

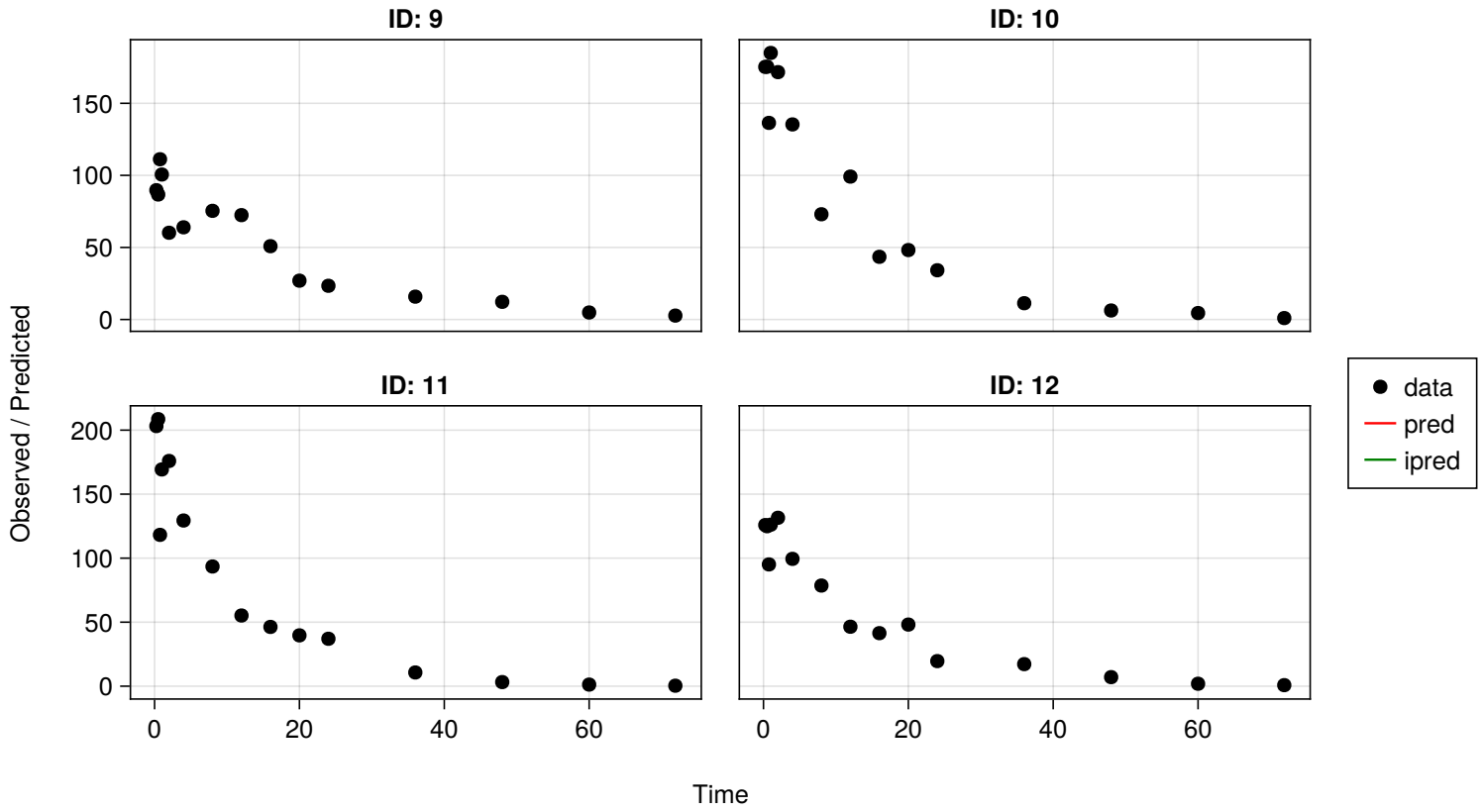

Figure 113: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (3 of 30)

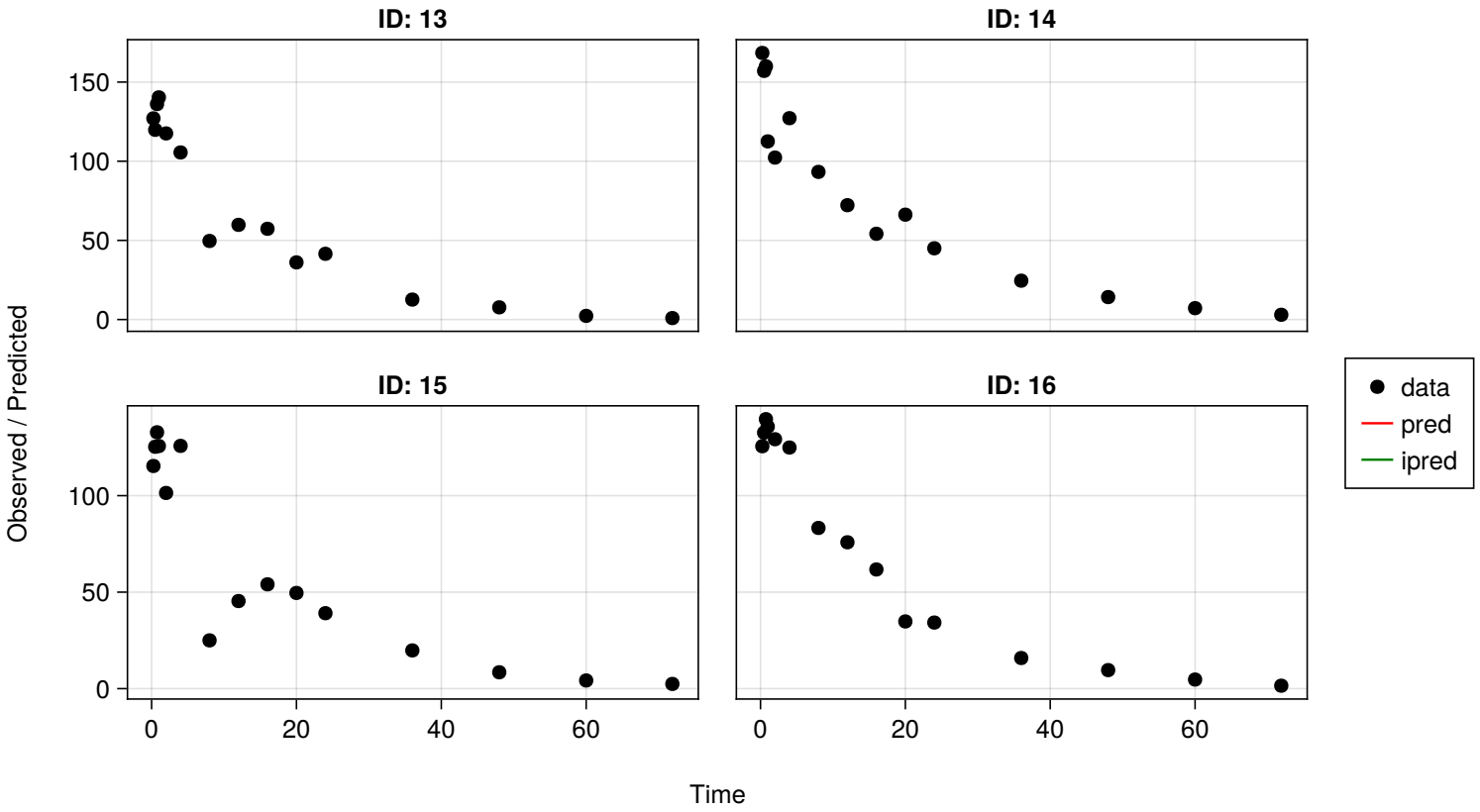

Figure 114: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (4 of 30)

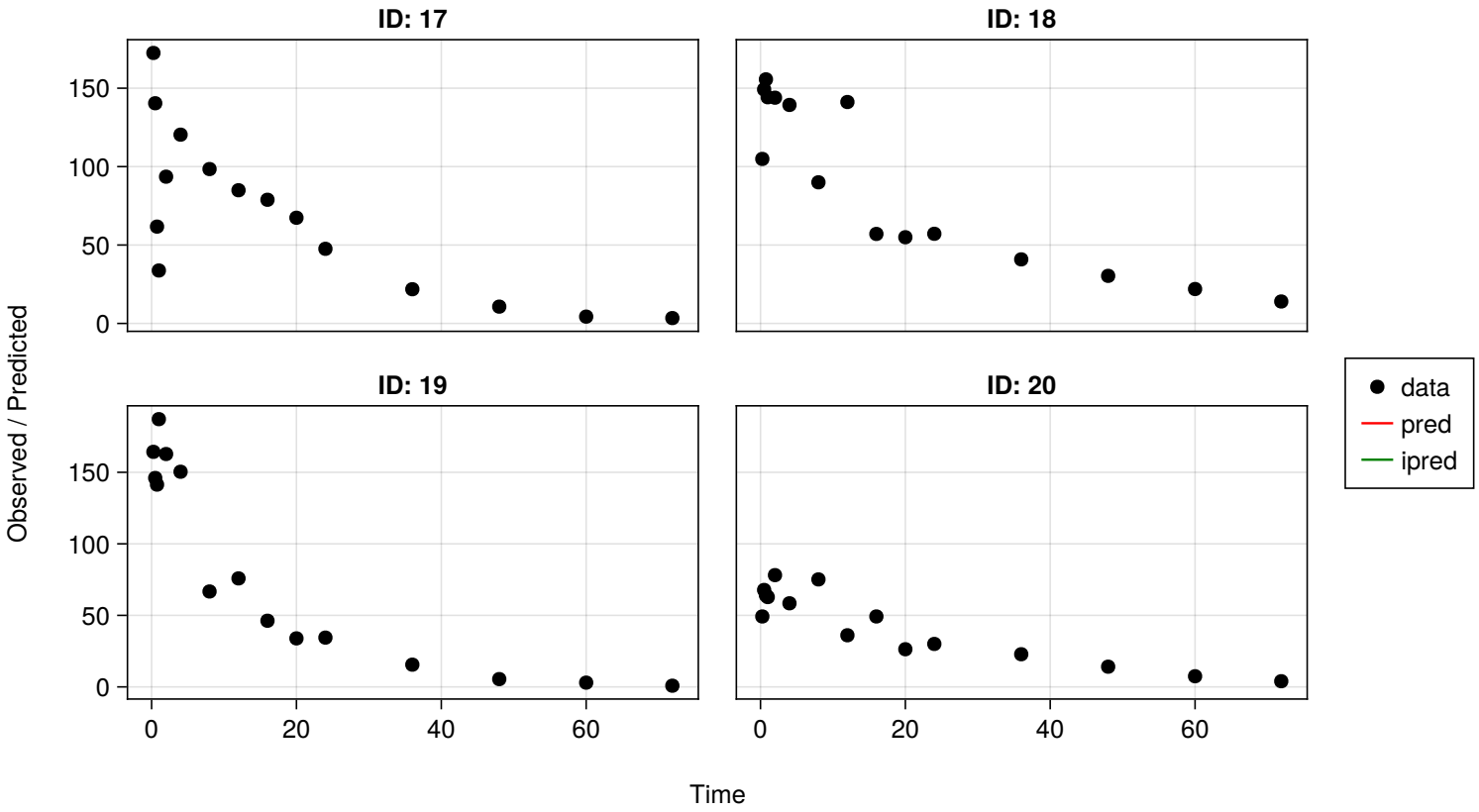

Figure 115: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (5 of 30)

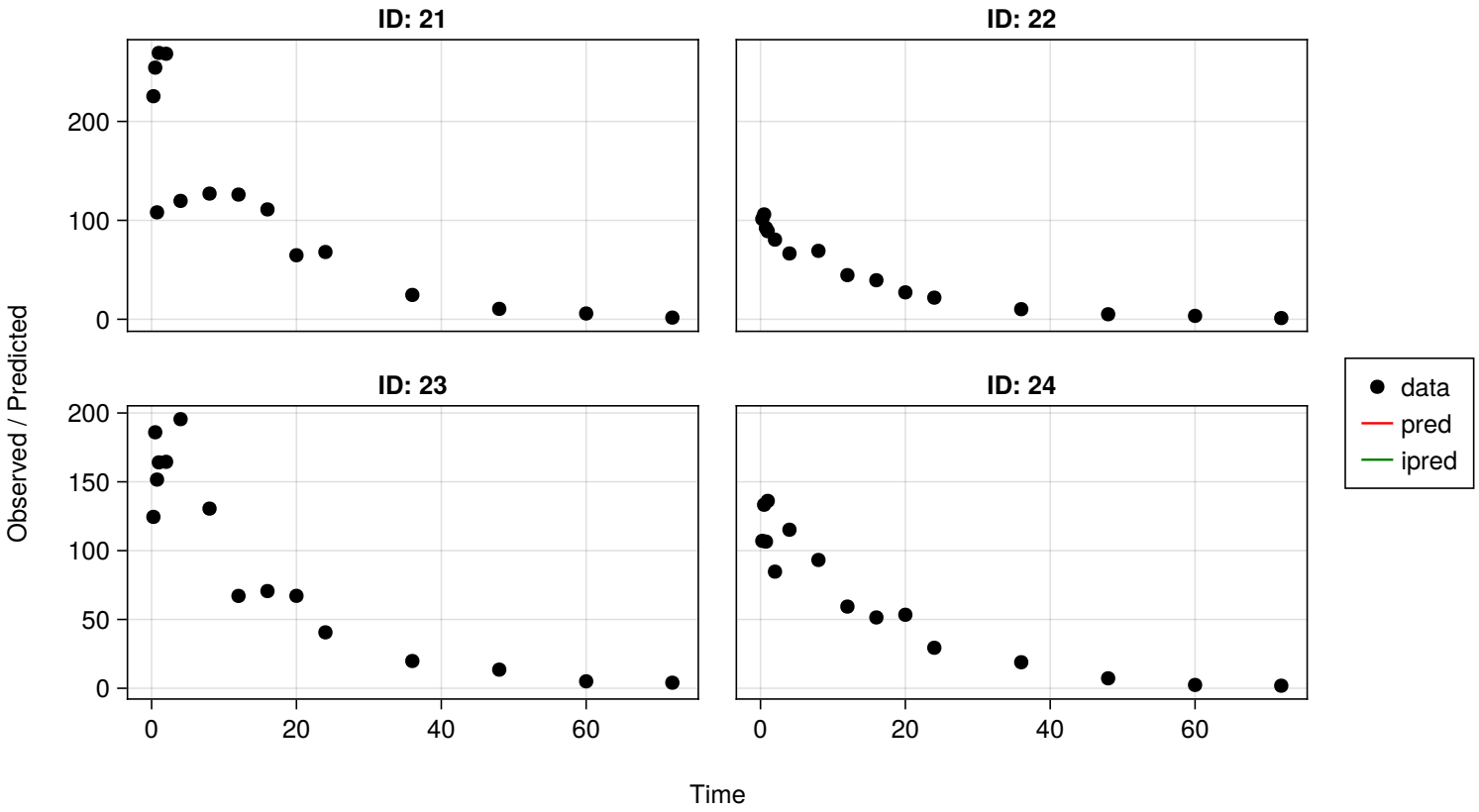

Figure 116: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (6 of 30)

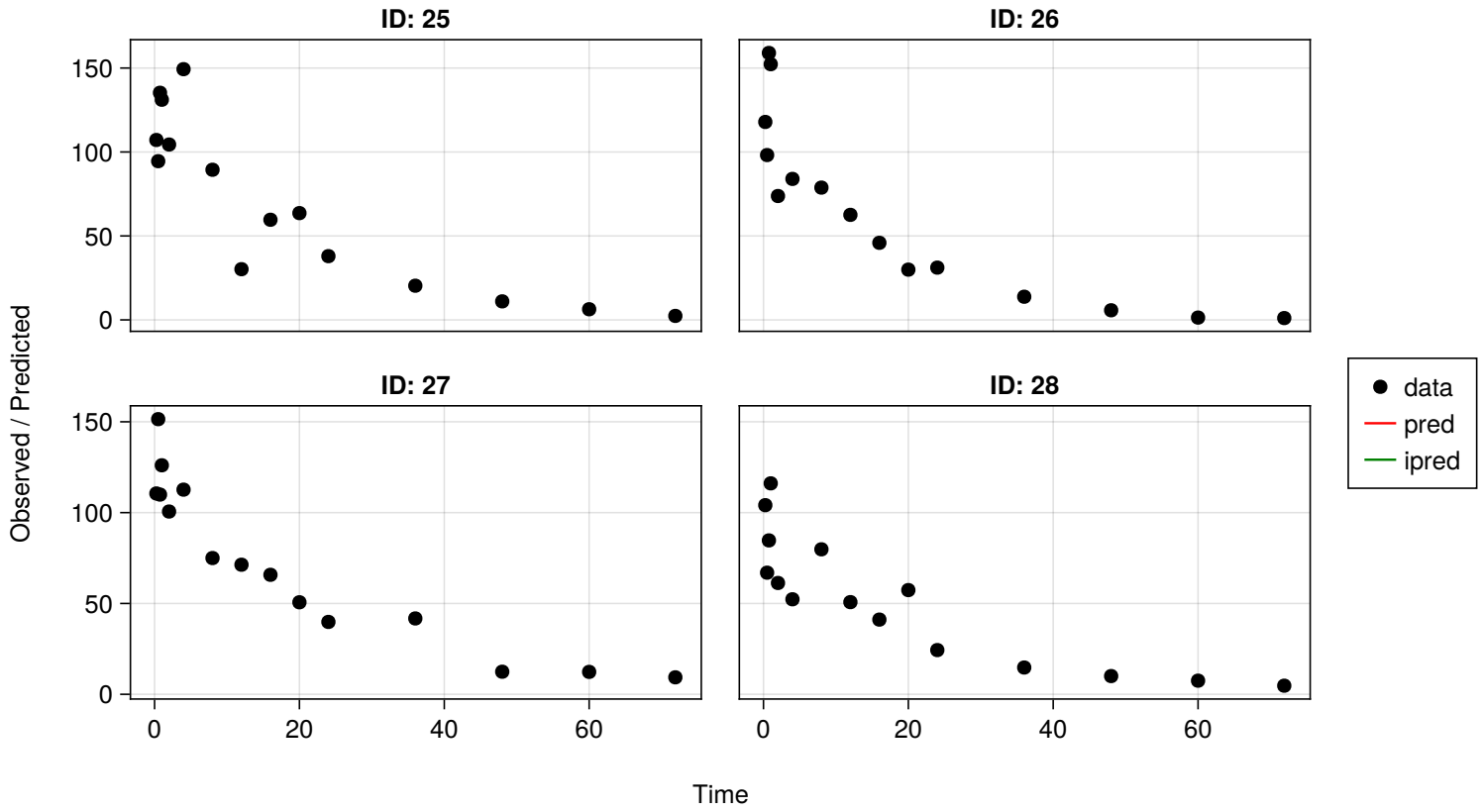

Figure 117: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (7 of 30)

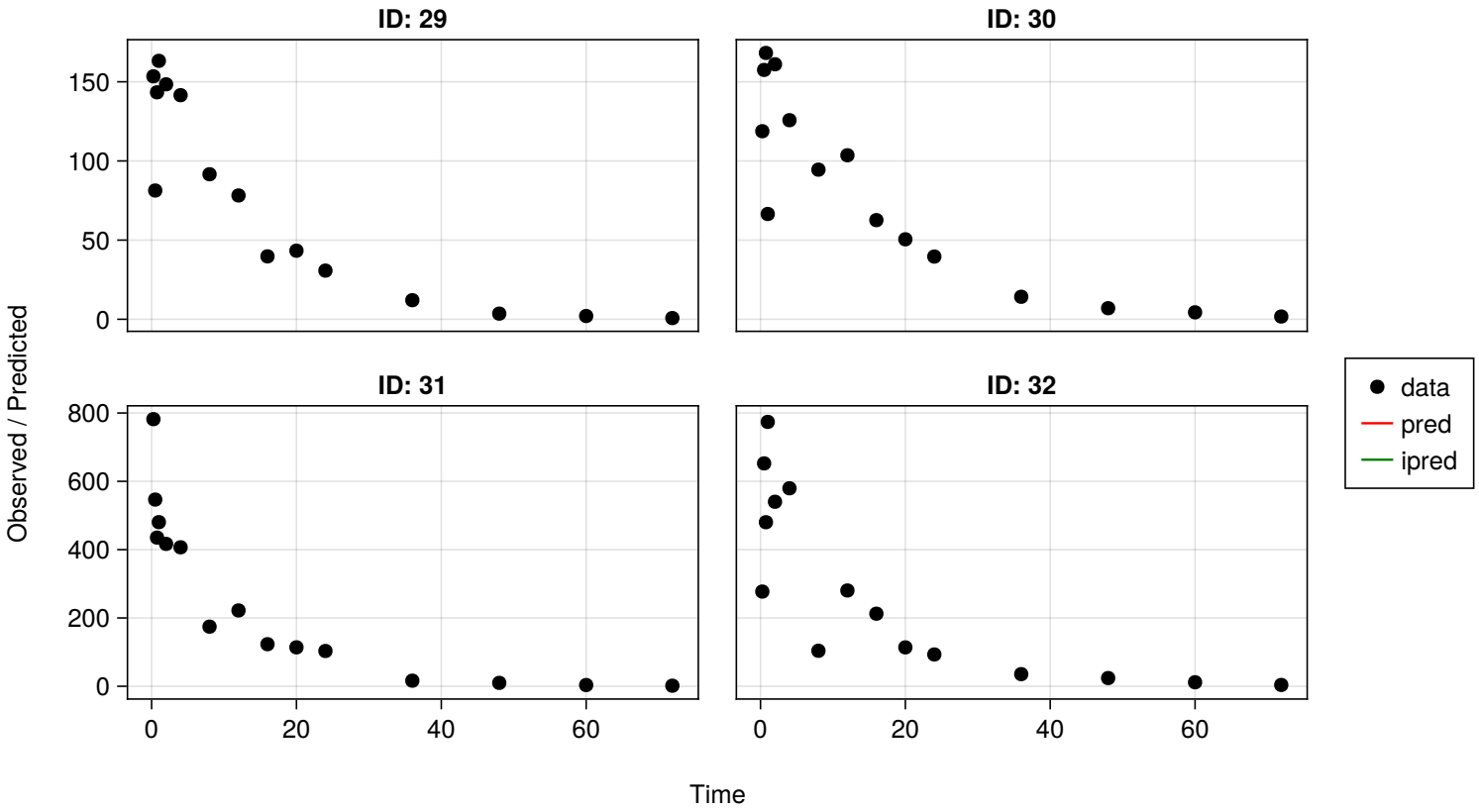

Figure 118: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (8 of 30)

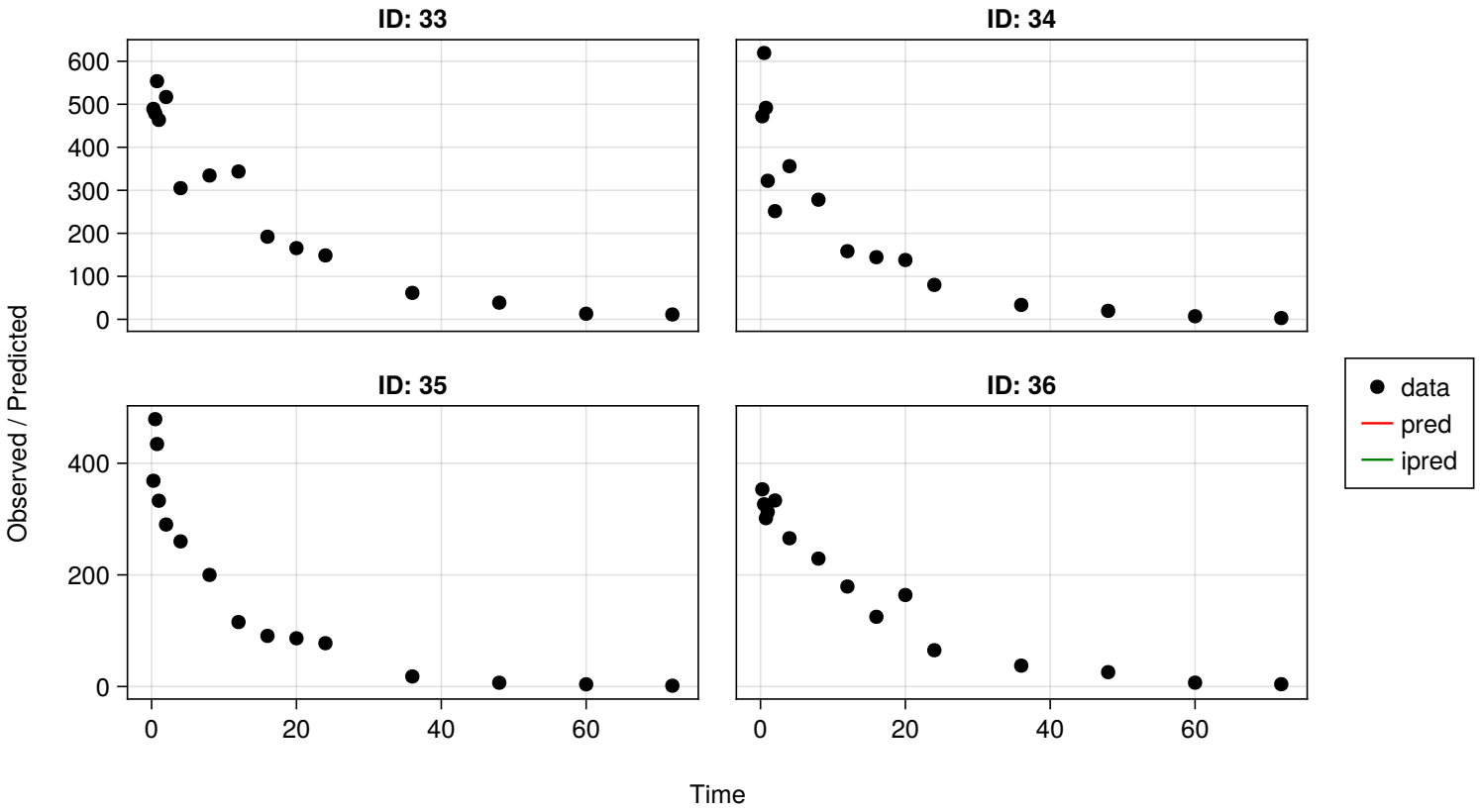

Figure 119: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (9 of 30)

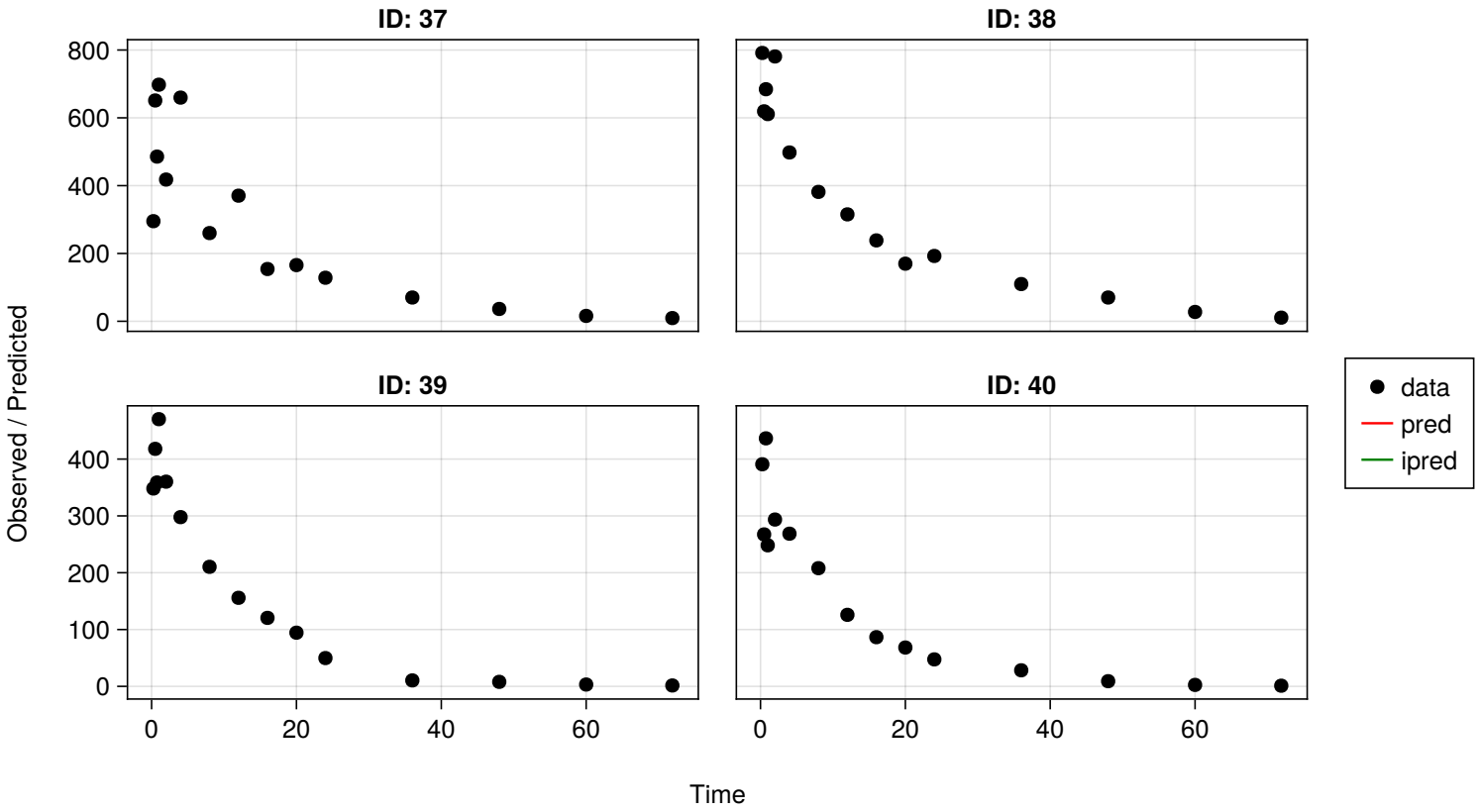

Figure 120: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (10 of 30)

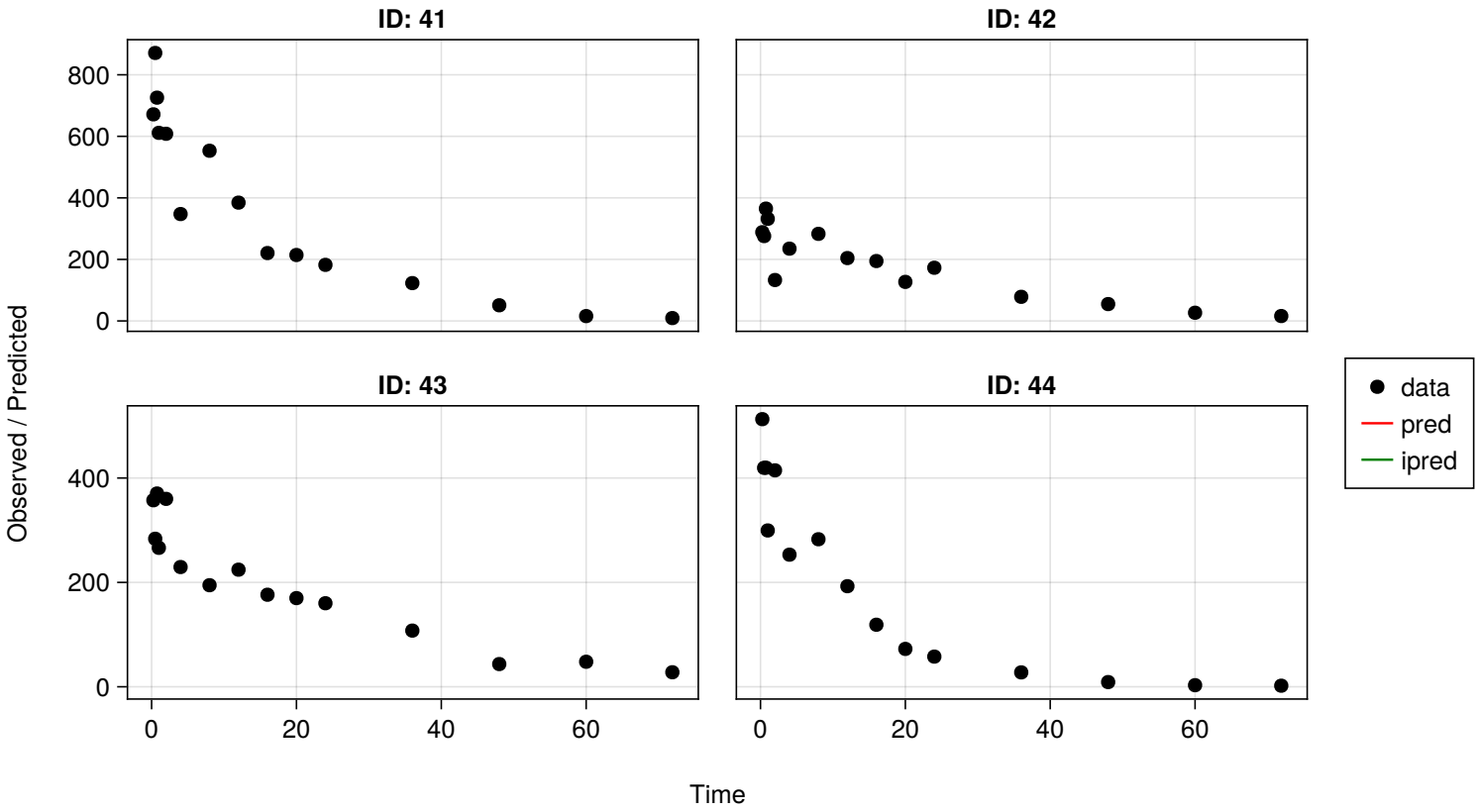

Figure 121: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (11 of 30)

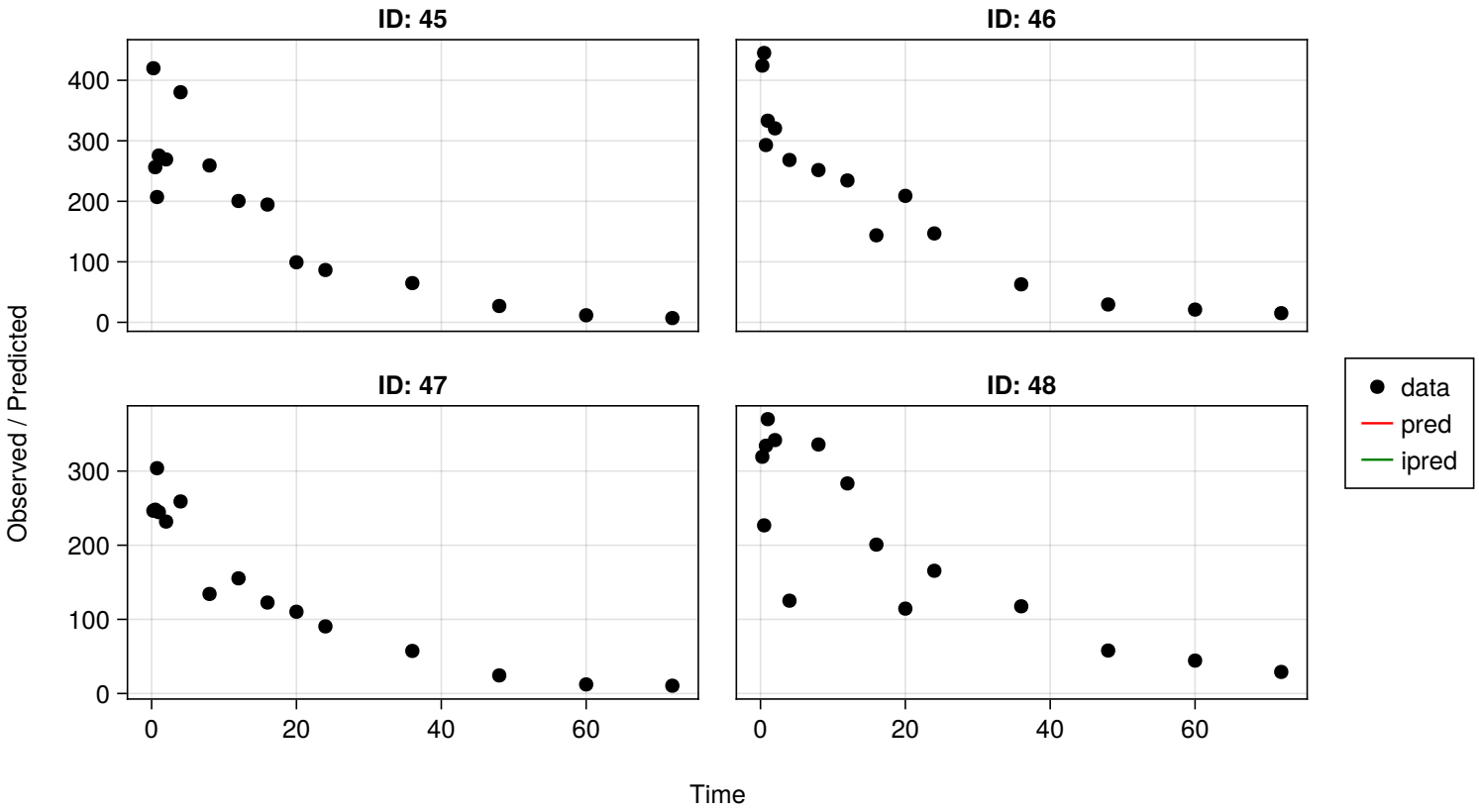

Figure 122: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (12 of 30)

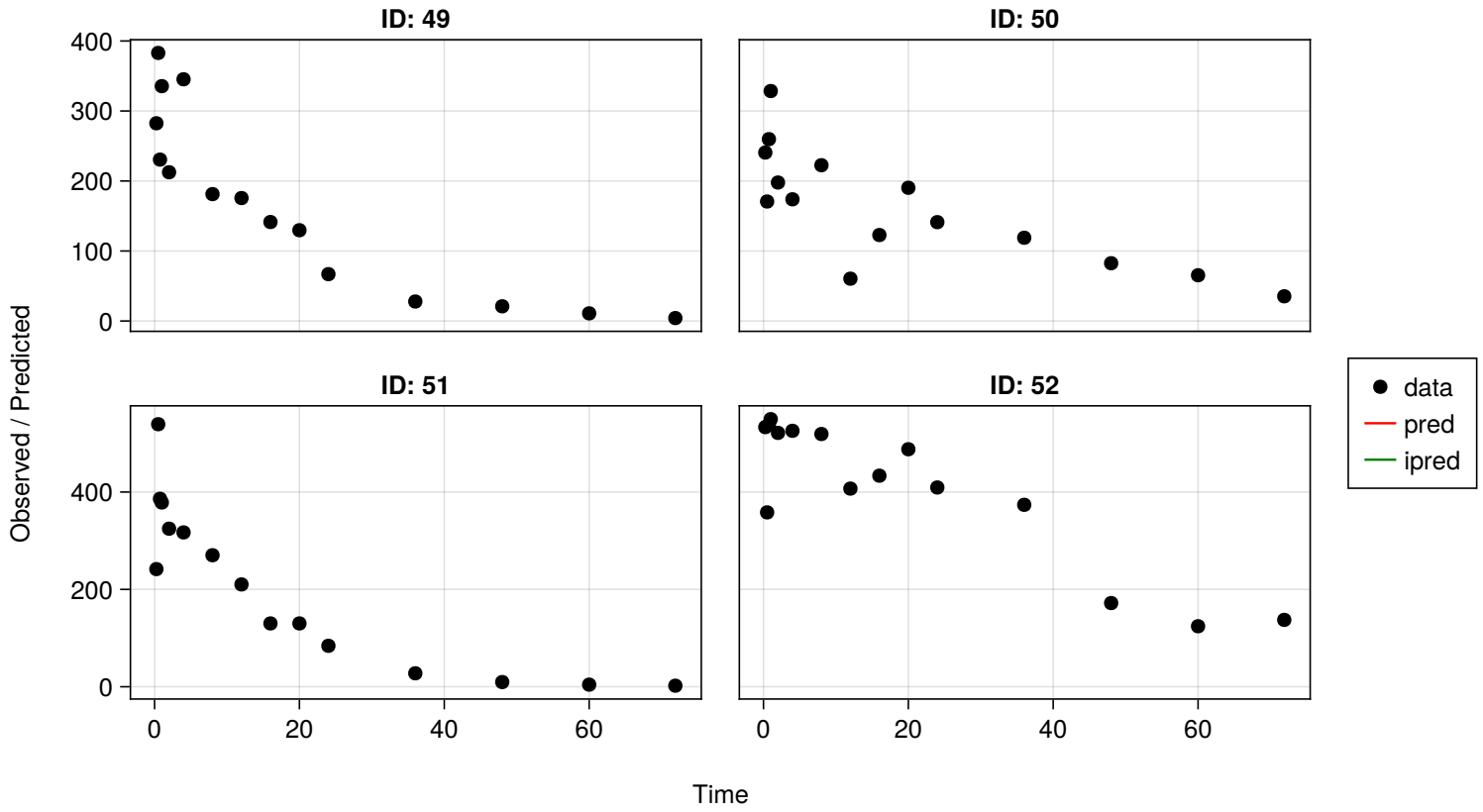

Figure 123: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (13 of 30)

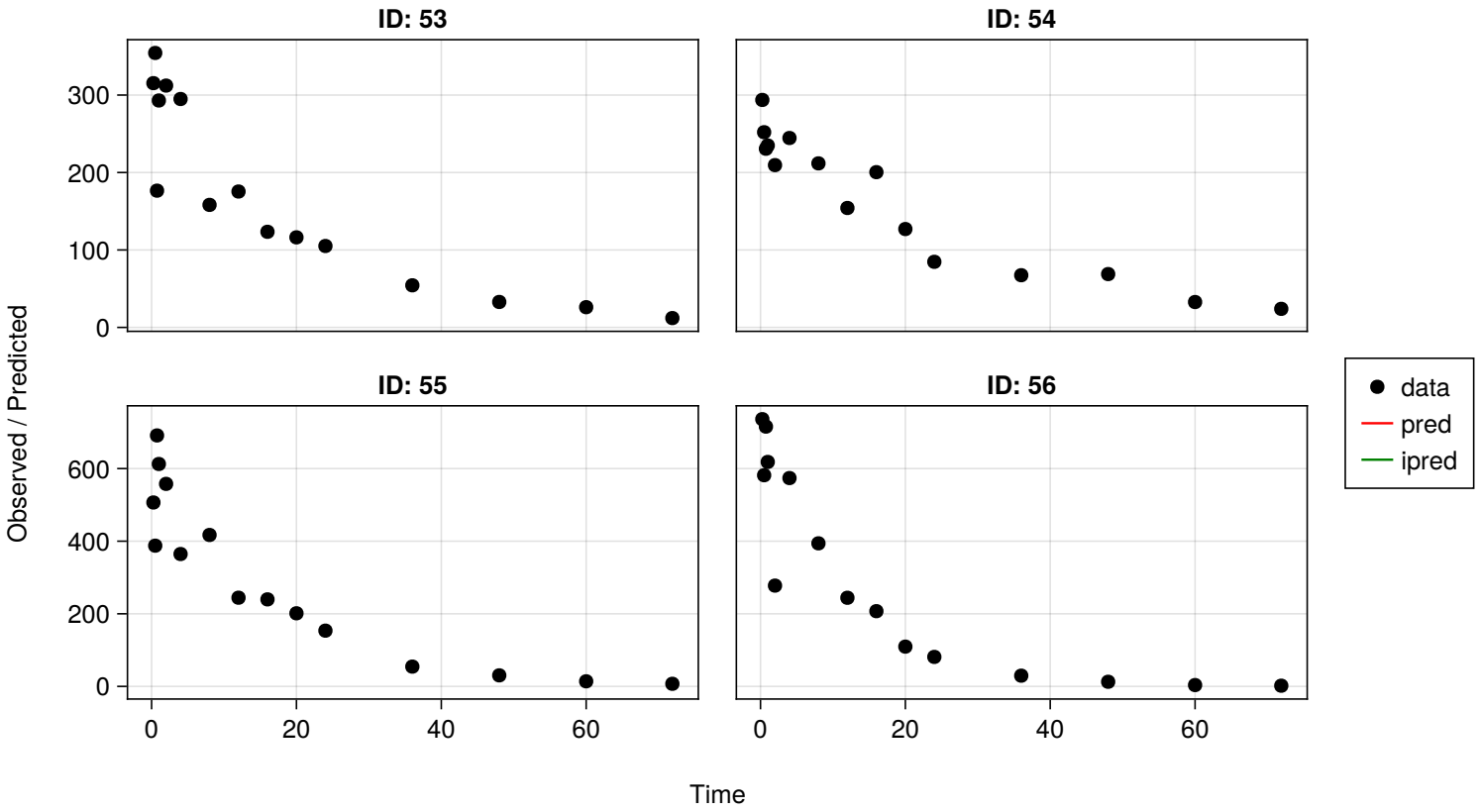

Figure 124: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (14 of 30)

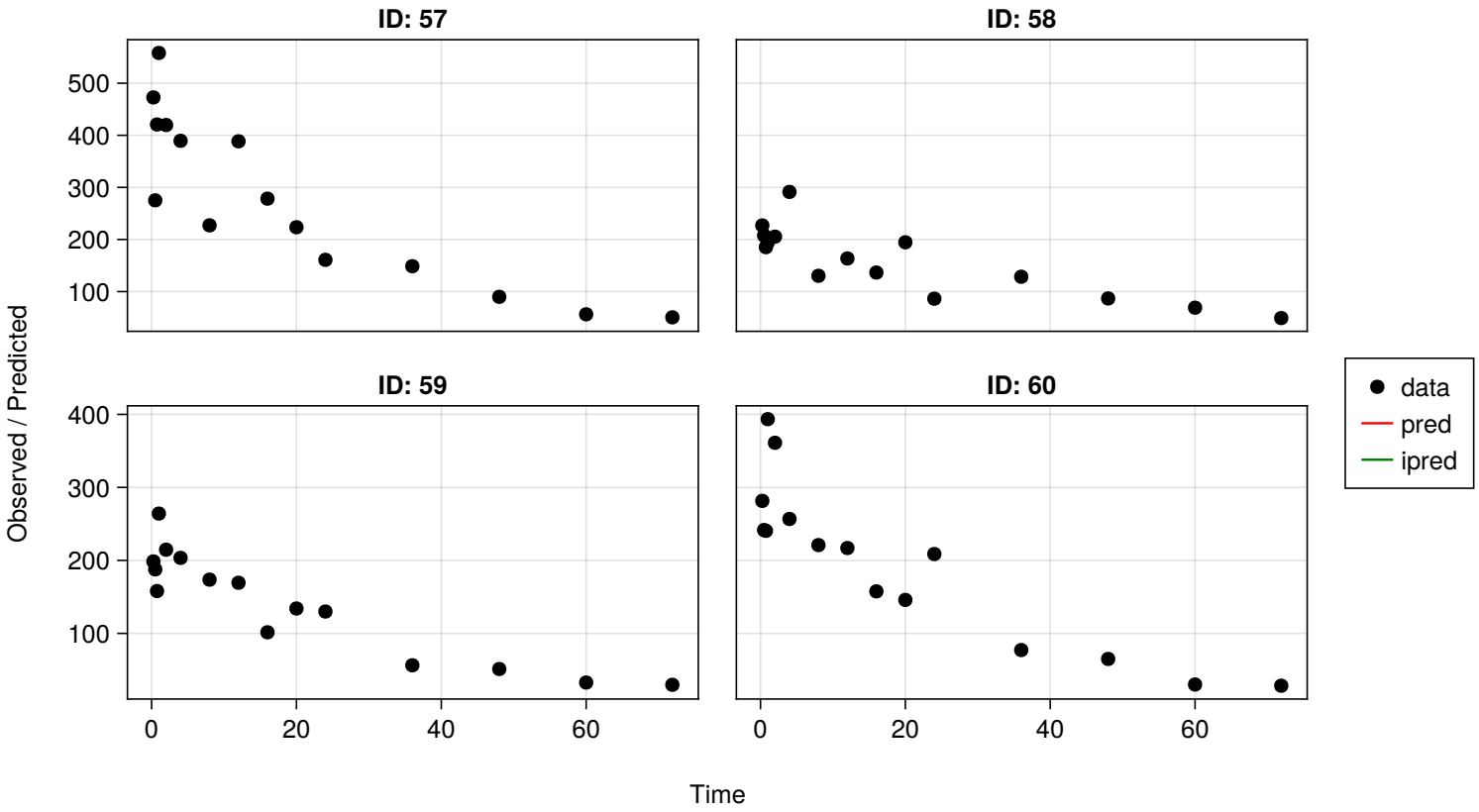

Figure 125: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (15 of 30)

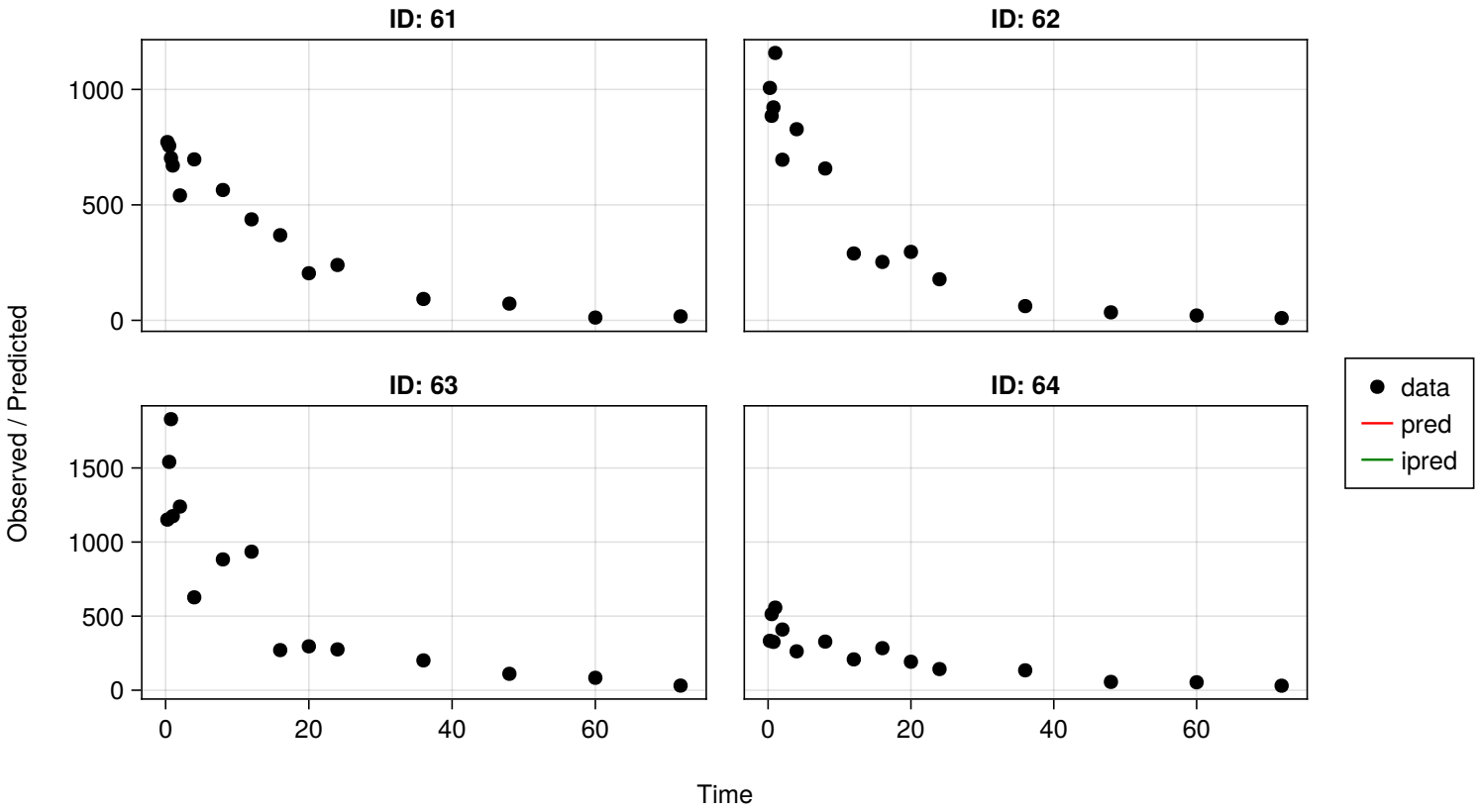

Figure 126: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (16 of 30)

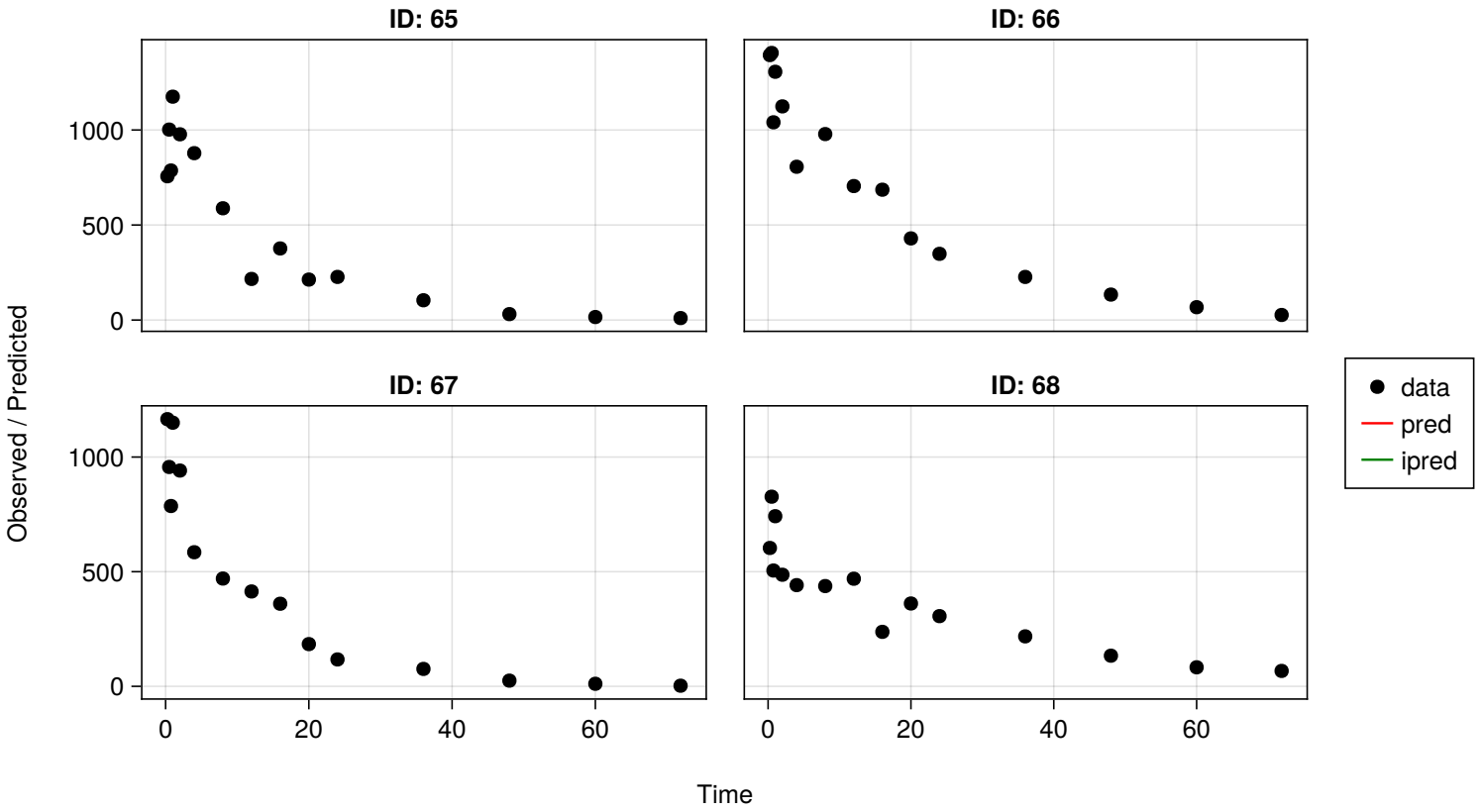

Figure 127: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (17 of 30)

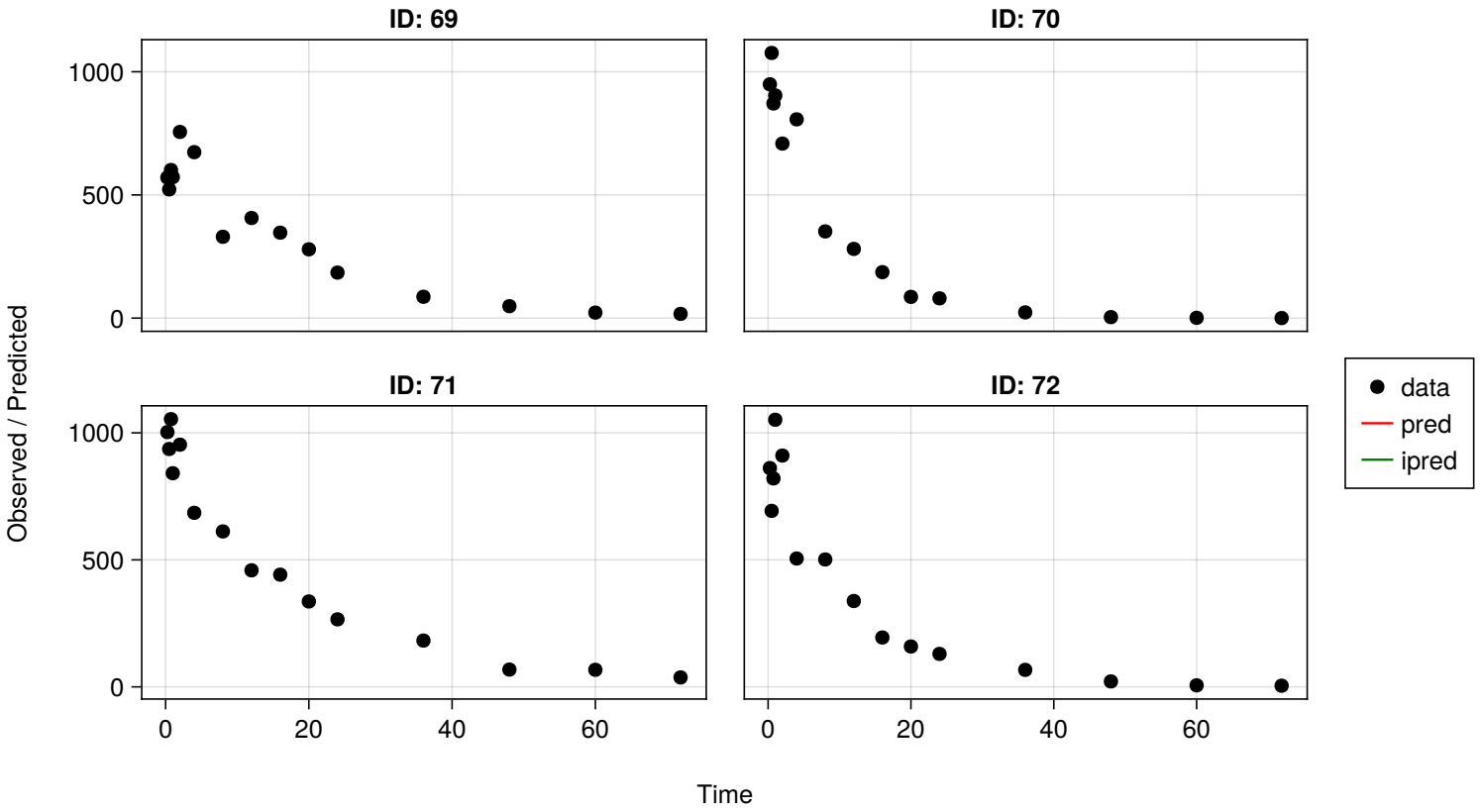

Figure 128: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (18 of 30)

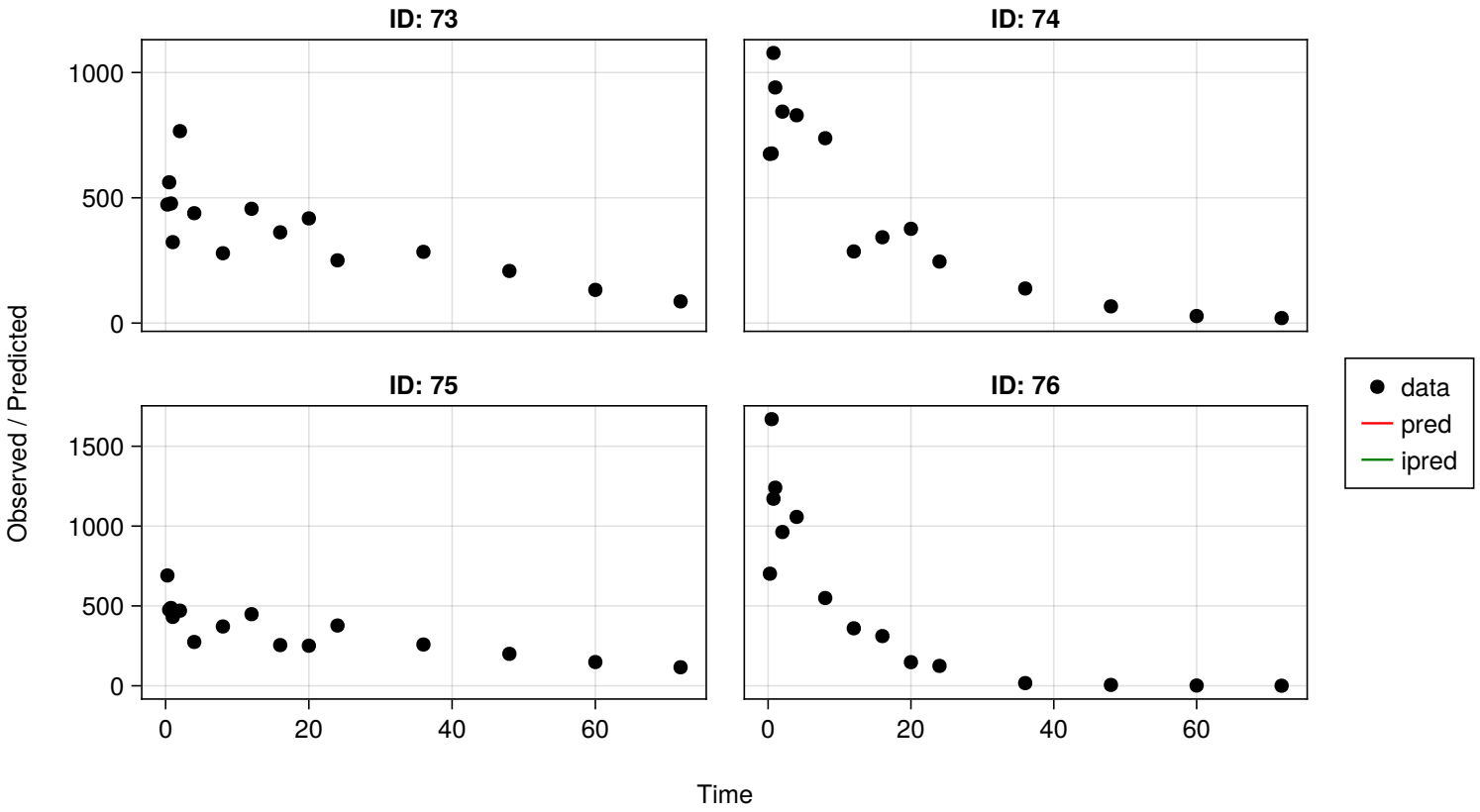

Figure 129: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (19 of 30)

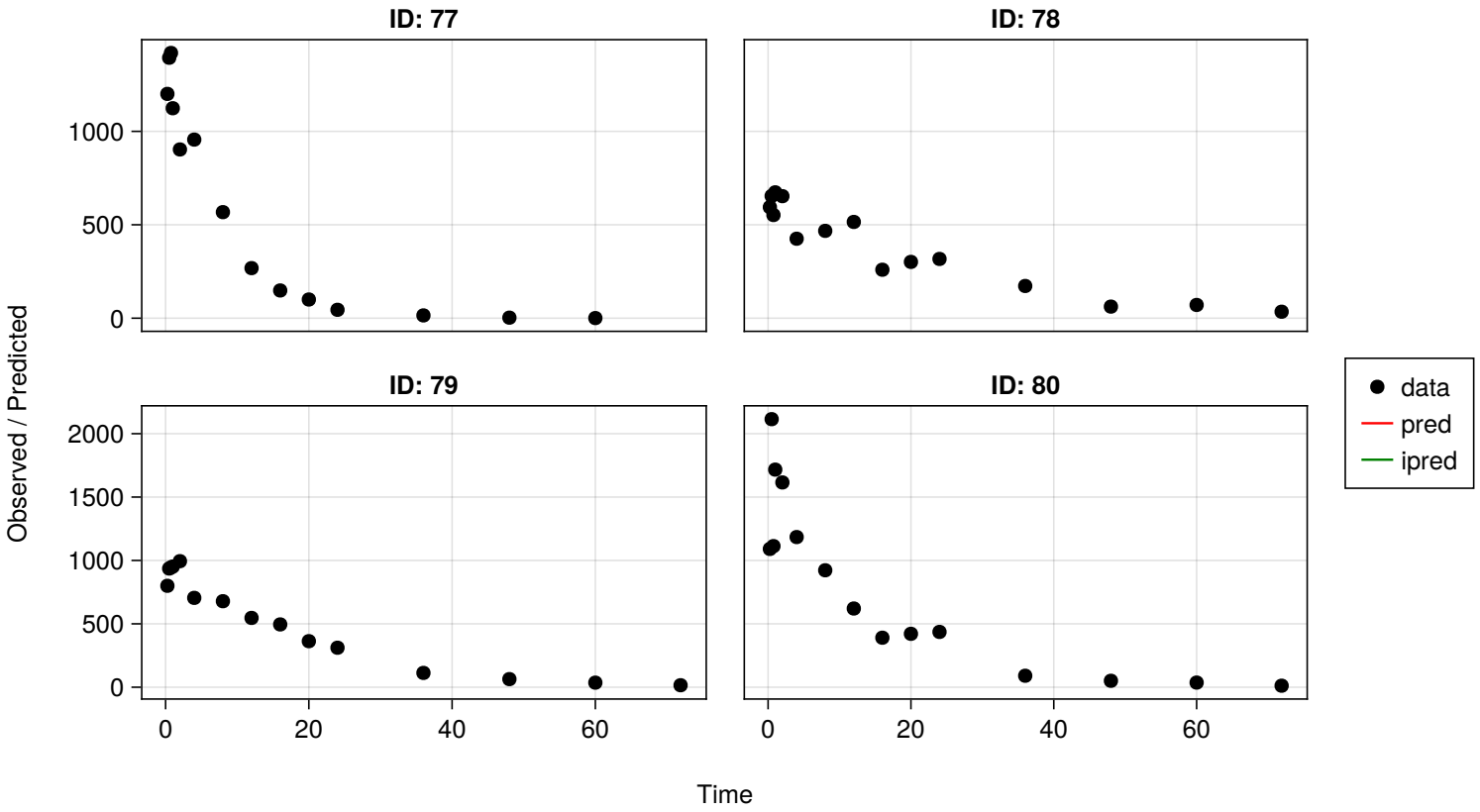

Figure 130: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (20 of 30)

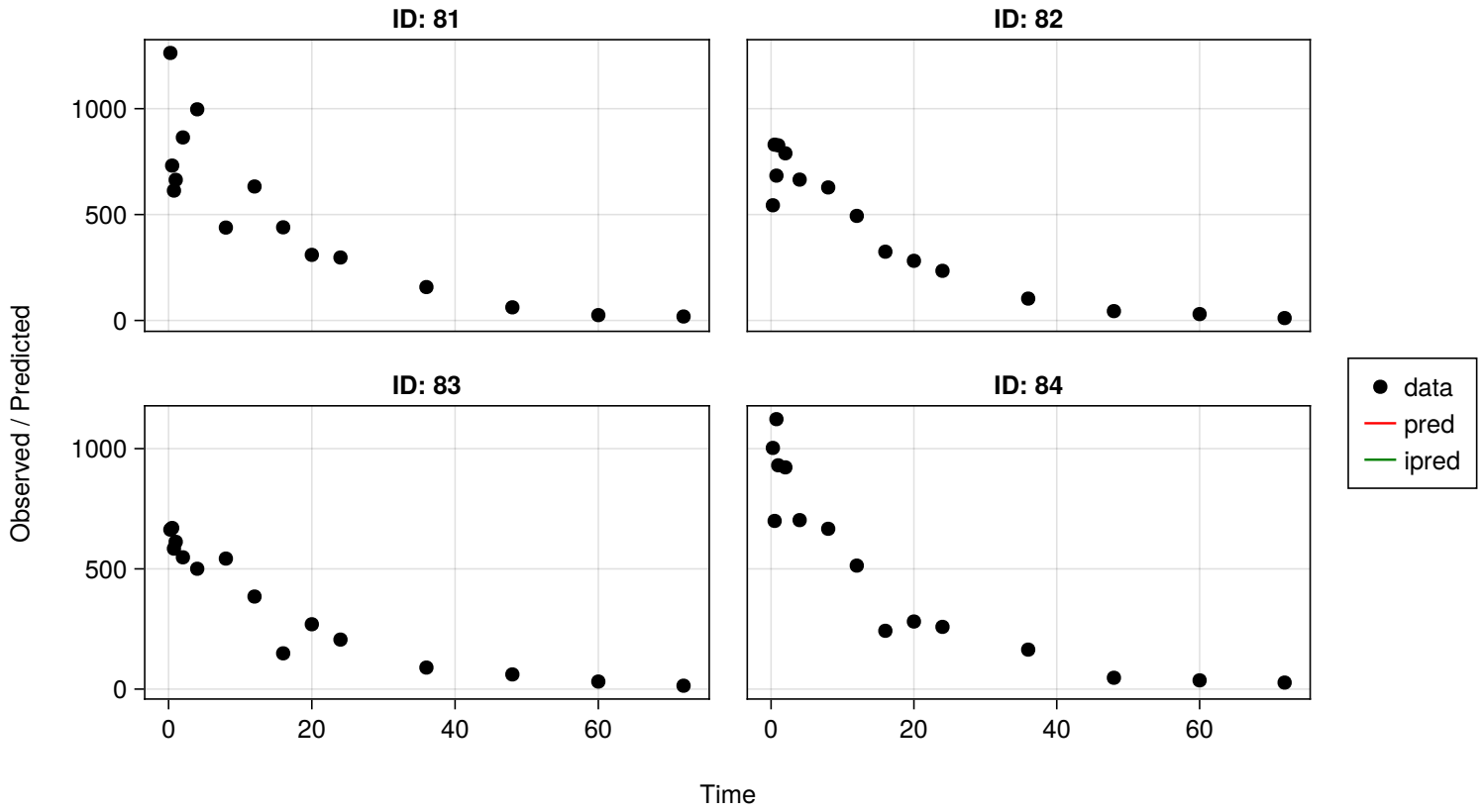

Figure 131: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (21 of 30)

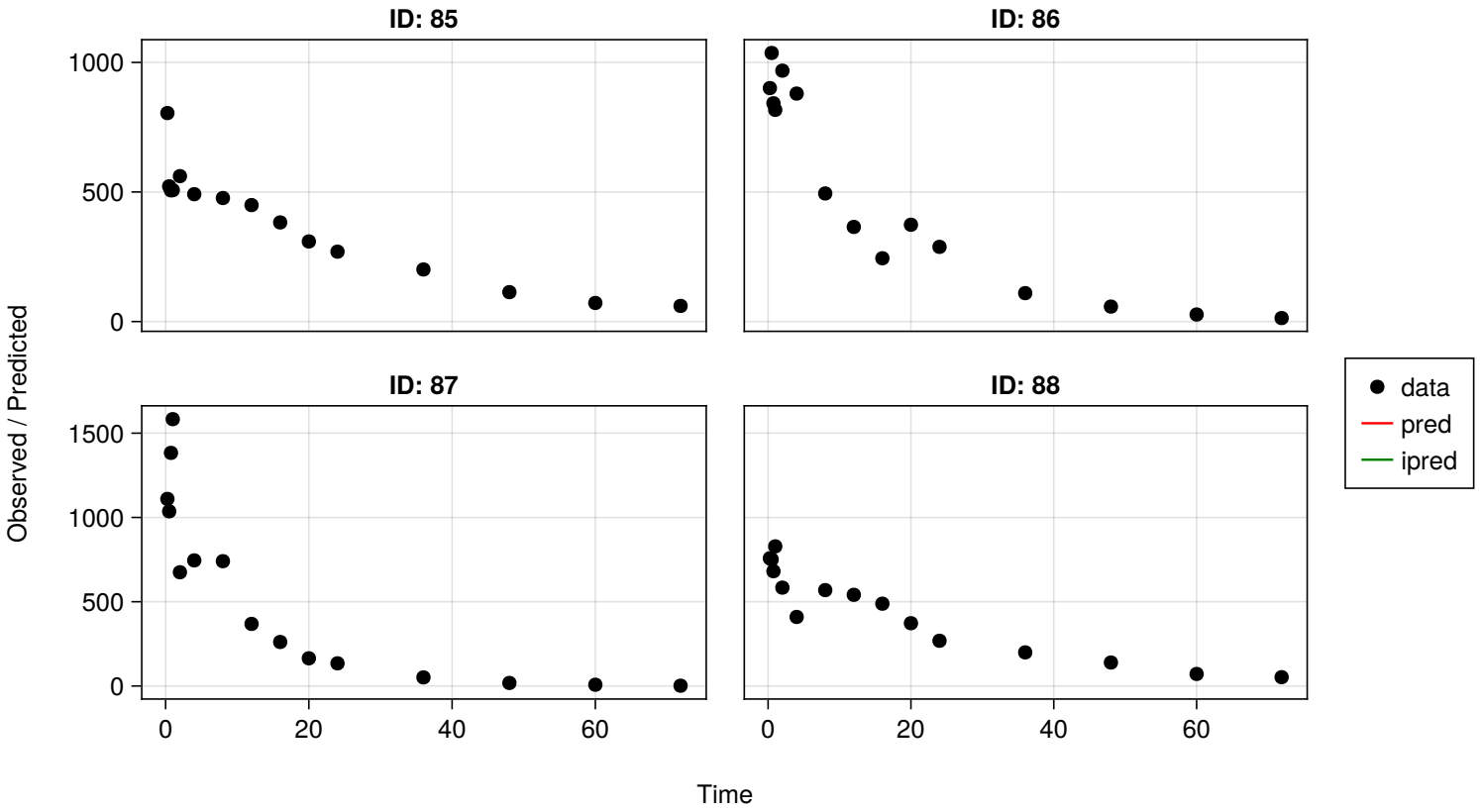

Figure 132: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (22 of 30)

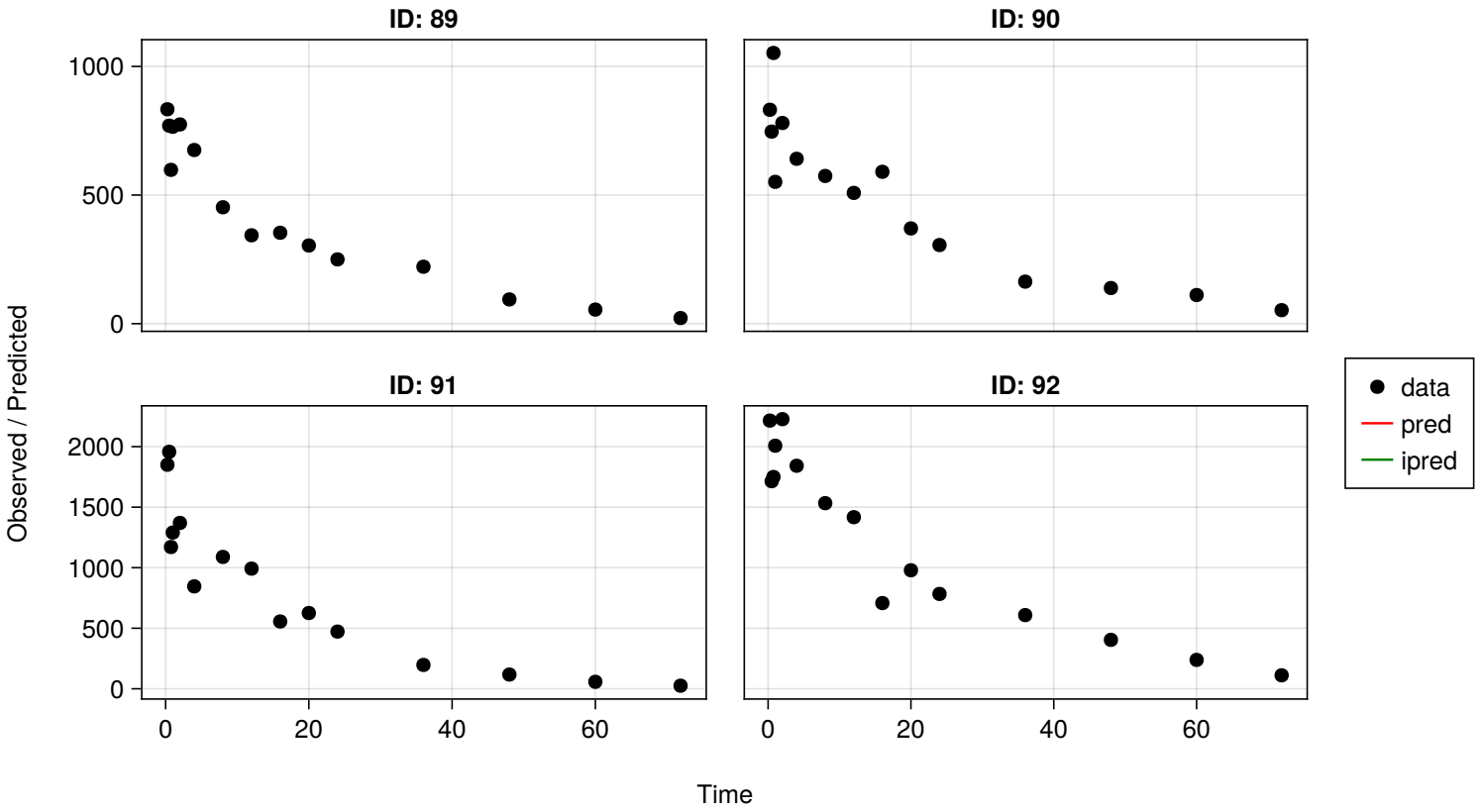

Figure 133: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (23 of 30)

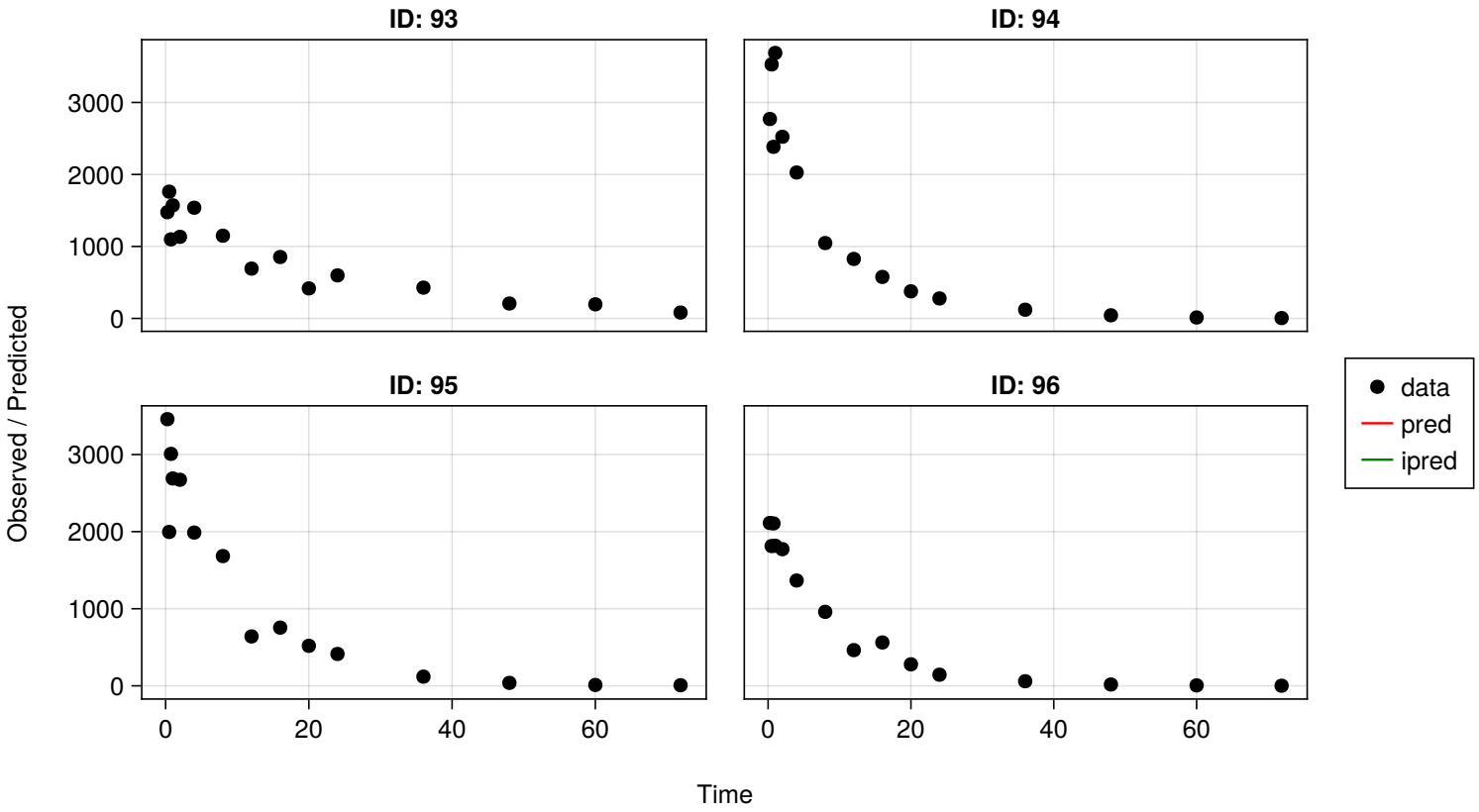

Figure 134: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (24 of 30)

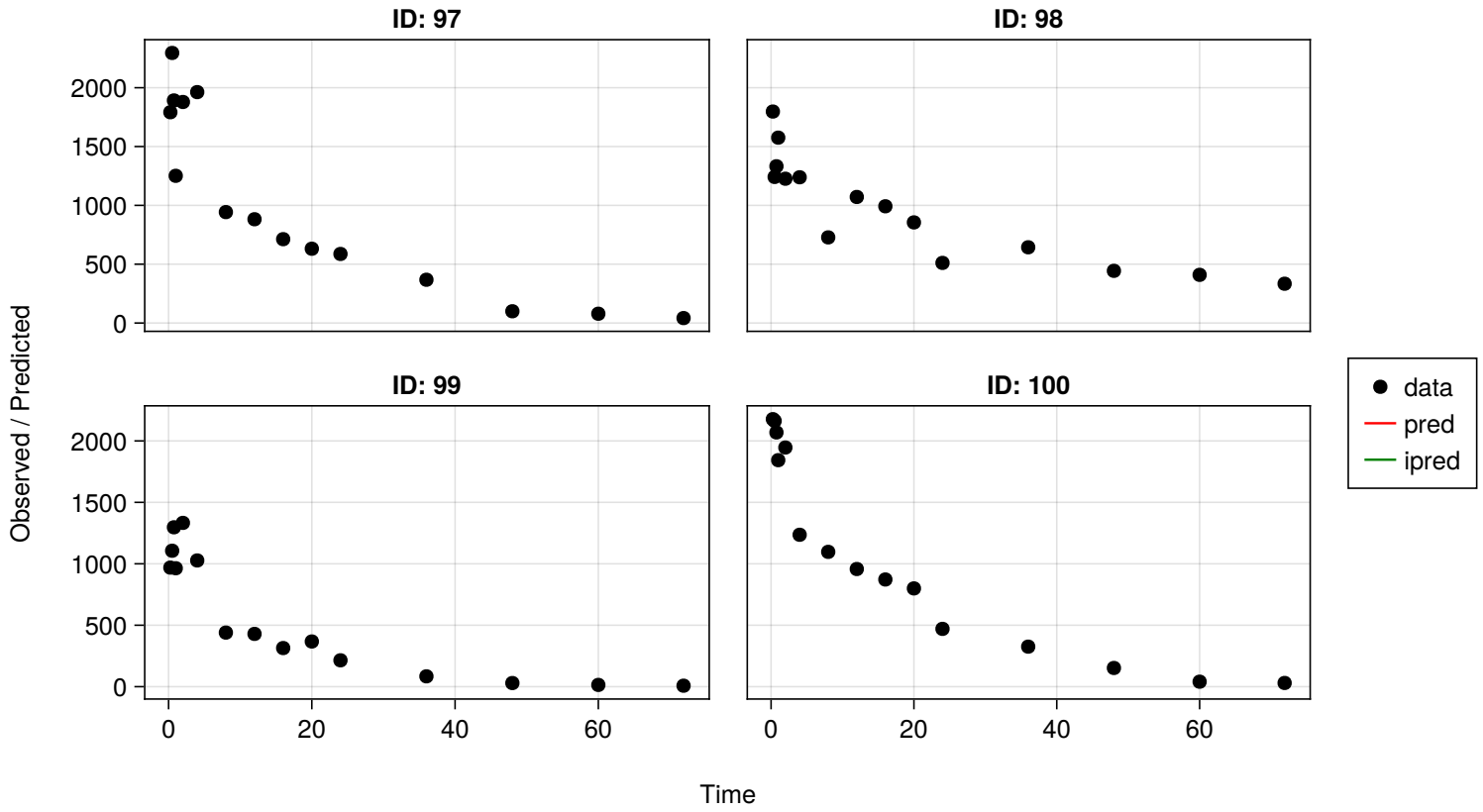

Figure 135: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (25 of 30)

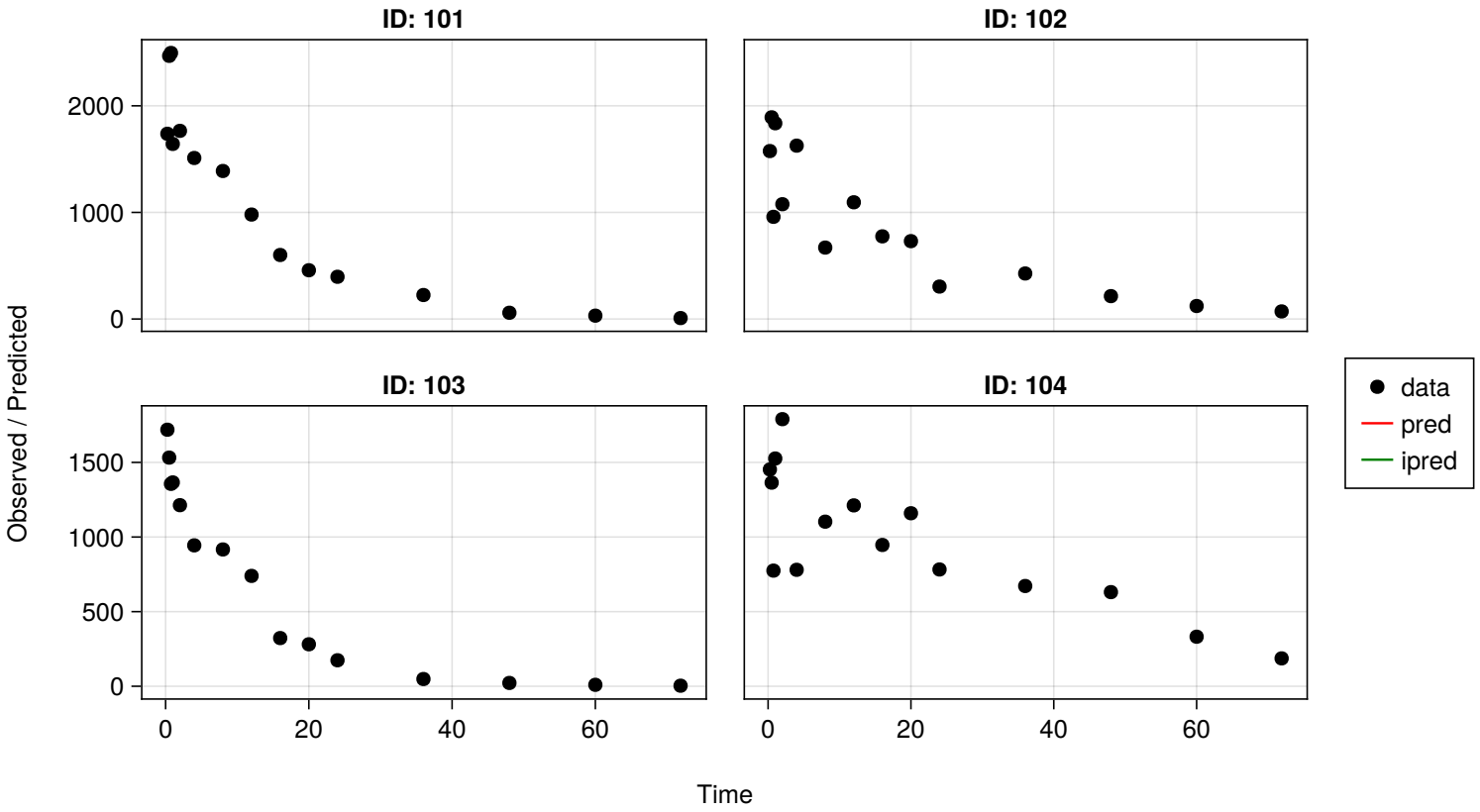

Figure 136: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (26 of 30)

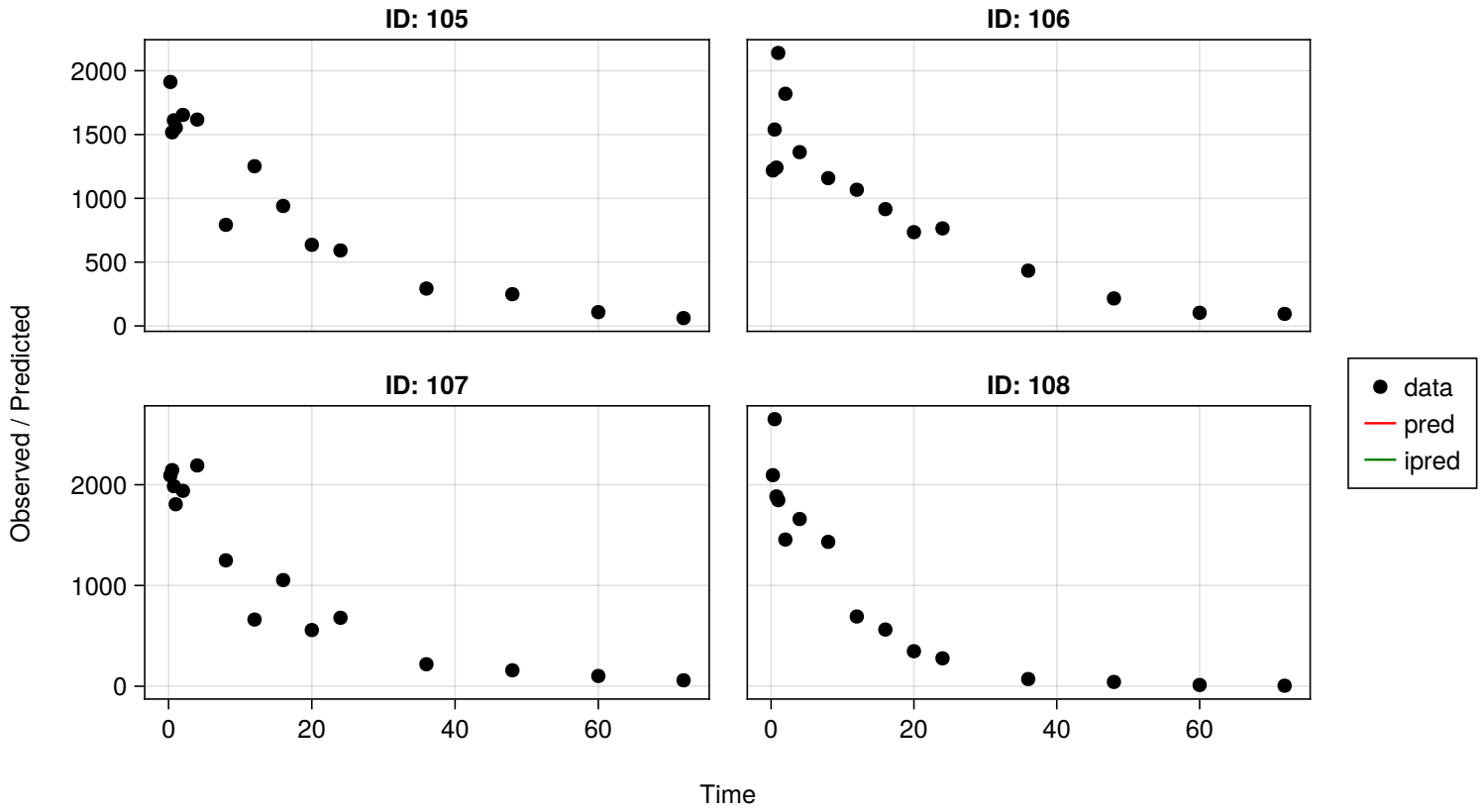

Figure 137: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (27 of 30)

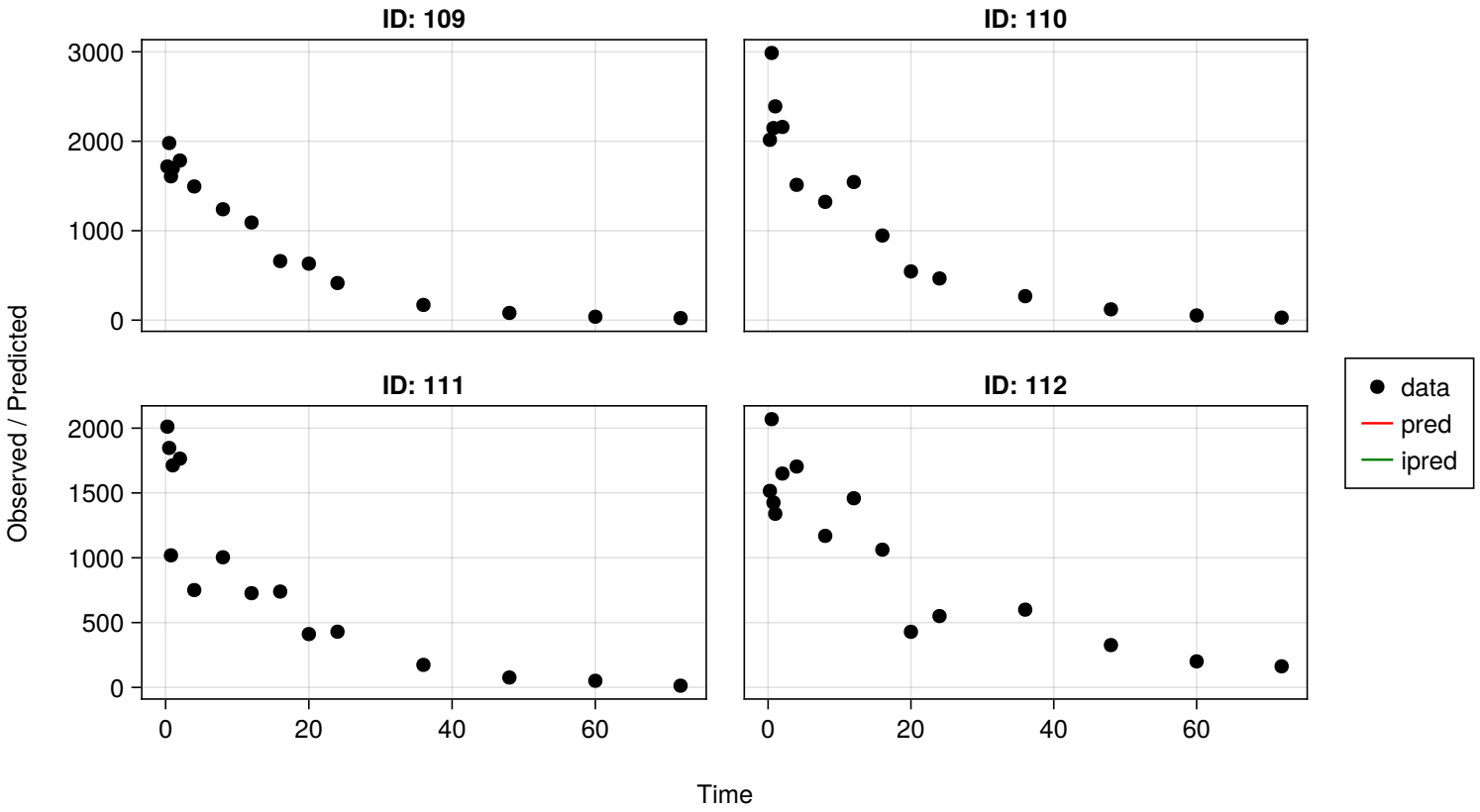

Figure 138: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (28 of 30)

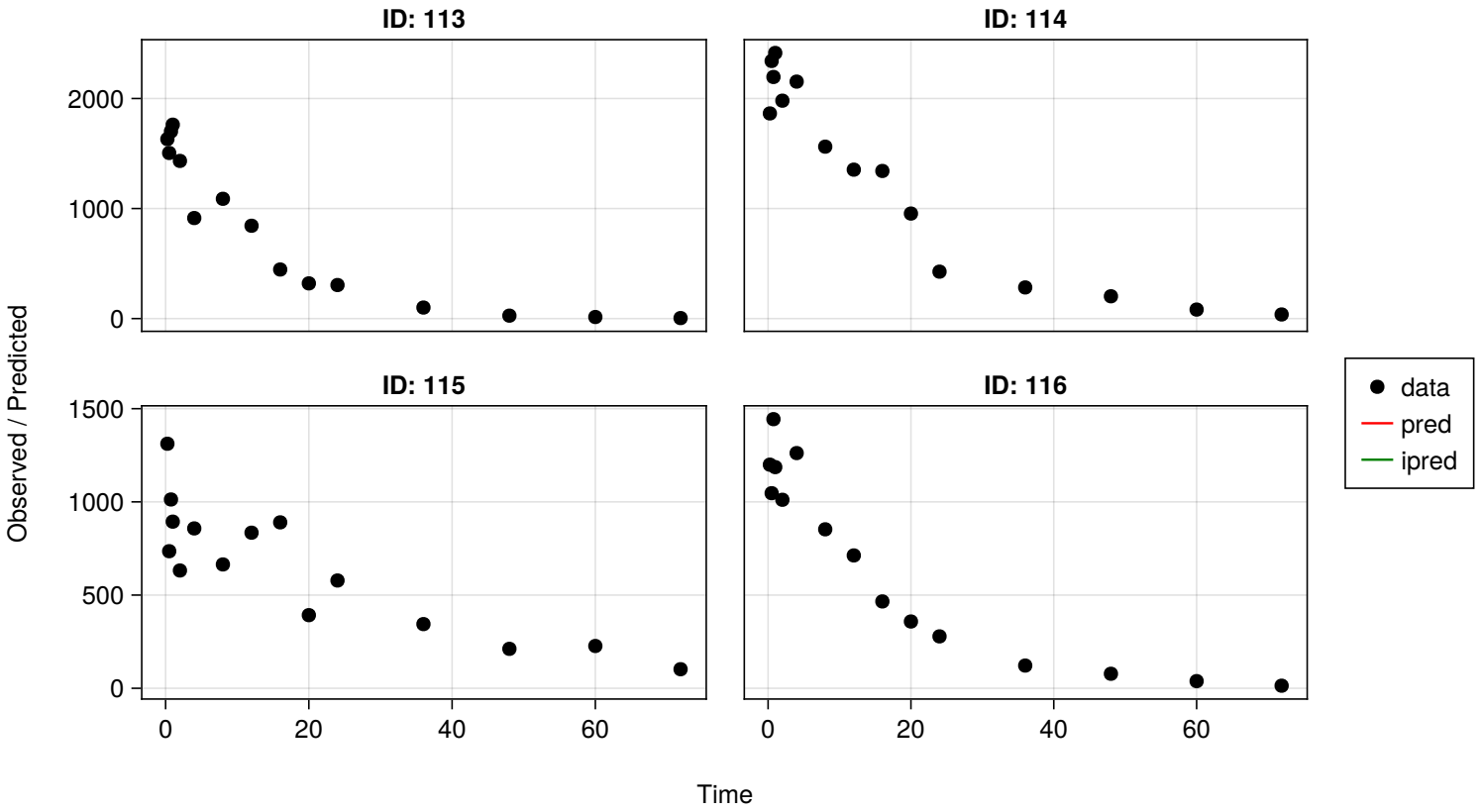

Figure 139: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (29 of 30)

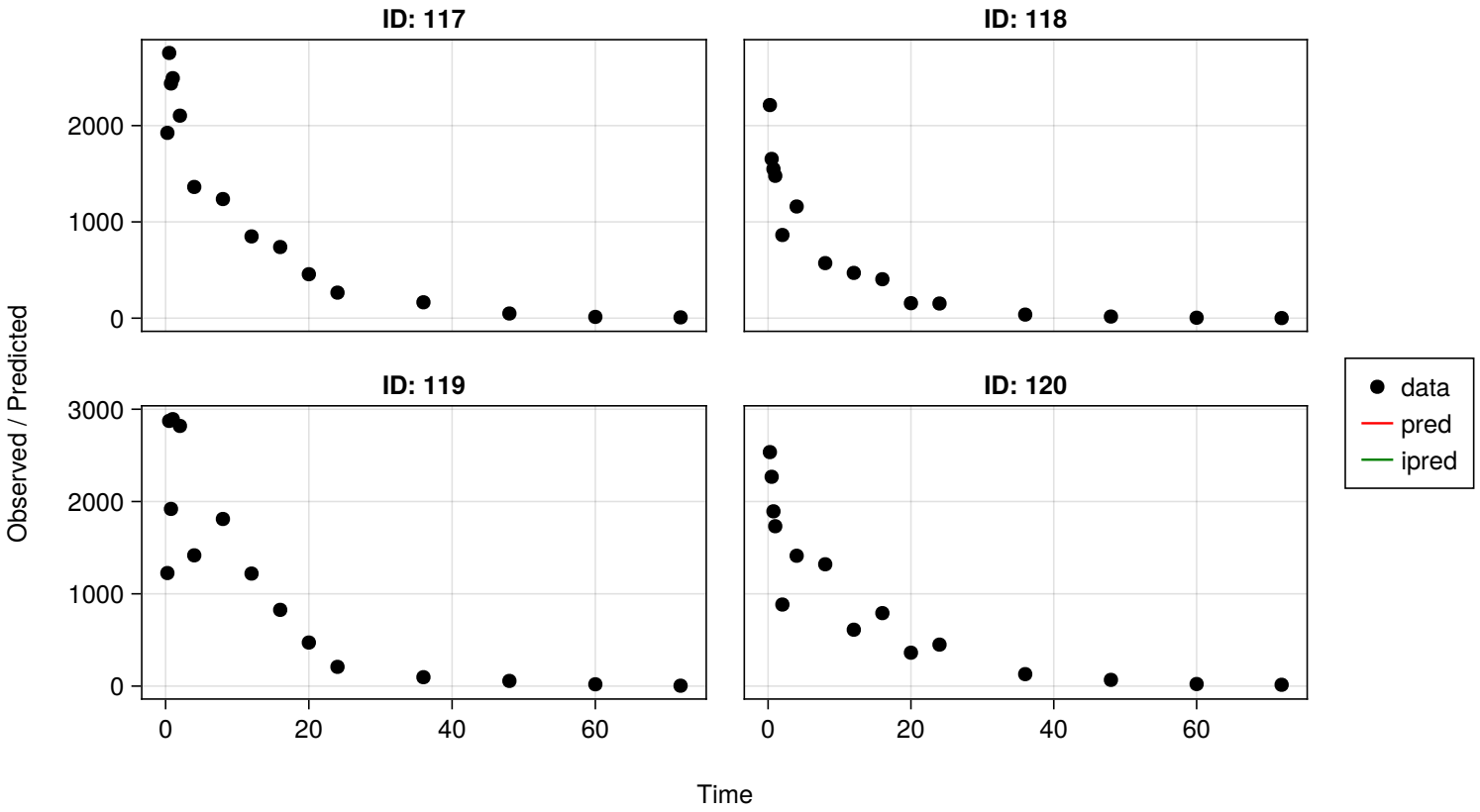

Figure 140: NaivePooled: Population and individual predictions overlaid over observations for Observed (dv) by ID (30 of 30)

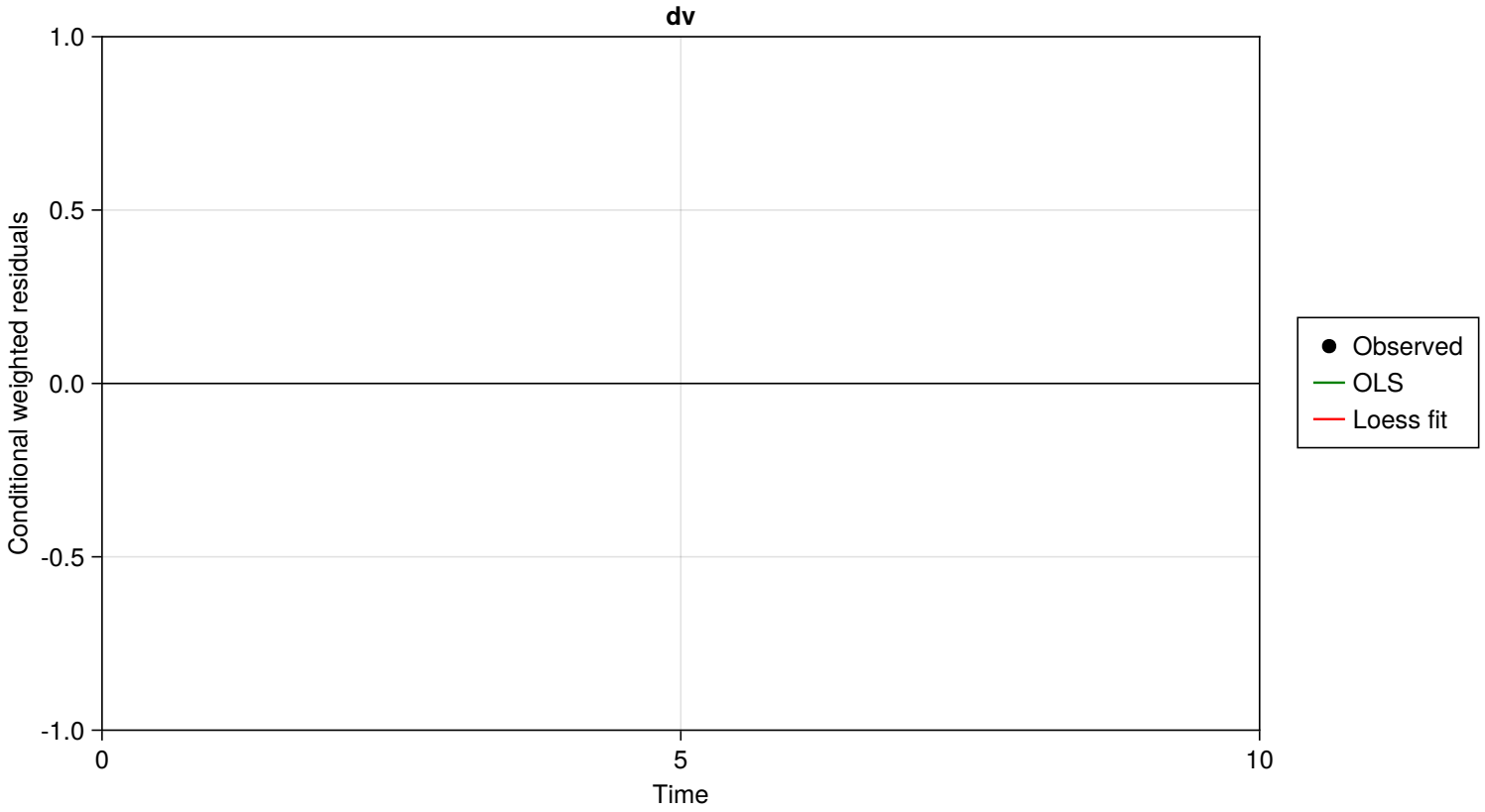

Figure 141: NaivePooled: Conditional weighted residuals Observed (dv) vs Time (1 of 1)

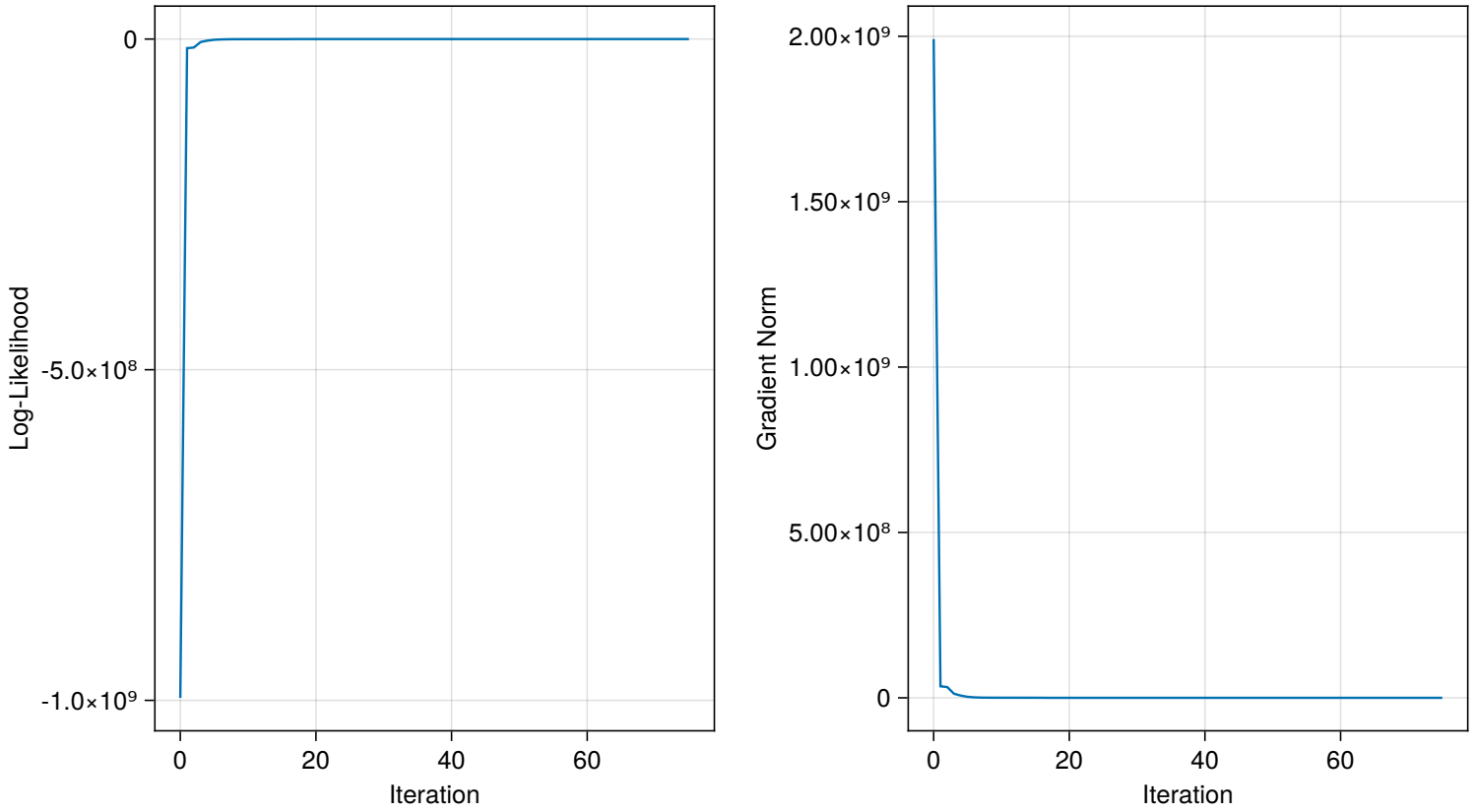

Figure 142: NaivePooled: Traceplot of loglikelihood and gradient norm (1 of 1)

A System Information

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Platform Info:
  OS: Linux (x86_64-pc-linux-gnu)
  uname: Linux 5.4.181-99.354.amzn2.x86_64 #1 SMP Wed Mar 2 18:50:46 UTC 2022 x86_64 x86_64
  CPU: Intel(R) Xeon(R) Platinum 8259CL CPU @ 2.50GHz:
              speed         user         nice          sys         idle          irq
       #1  3099 MHz       2344 s          1 s        460 s     120314 s          0 s
       #2  3100 MHz       2364 s         20 s        489 s     120241 s          0 s
       #3  3100 MHz       2419 s         13 s        465 s     120258 s          0 s
       #4  3100 MHz       3279 s         20 s        491 s     119363 s          0 s
       #5  3099 MHz       2899 s          2 s        457 s     119775 s          0 s
       #6  3100 MHz       2553 s         15 s        462 s     120101 s          0 s
       #7  3099 MHz       2100 s         44 s        458 s     120540 s          0 s
       #8  3099 MHz       2068 s         25 s        450 s     120557 s          0 s

  Memory: 30.90927505493164 GB (11656.4609375 MB free)
  Uptime: 12347.12 sec
  Load Avg:  0.92  0.43  0.27
  WORD_SIZE: 64
  LIBM: libopenlibm
  LLVM: libLLVM-12.0.1 (ORCJIT, skylake-avx512)
Environment:
  JULIAHUB_USEREMAIL = tchamzas@gmail.com
  JULIAHUB_HOME = /opt/juliahub
  JULIARUN_DATA_FOLDER = 11327418835972800610
  JULIARUN_JOB_ID = lobscda9og
  JULIA_PKG_USE_CLI_GIT = true
  JULIA_GR_PROVIDER = BinaryBuilder
  JULIA_LOAD_PATH = @:@v#.#:@stdlib:/opt/juliahub/projects/default:/opt/juliahub/projects/
      ↪ default
  JULIAHUB_NAMESPACE = 11327418835972800610
  JULIA_NEW_PKG_SERVER = https://umb.juliahub.com/
  JULIA_DATASETS_PATH = /var/run/secrets/jr-lobscda9ogsecret/DATA_TOML:/opt/juliahub/
      ↪ JuliaHubDataDriver.toml:@:
  JULIAHUB_USERNAME = tchamzas
  JULIARUN_JOB_START_TIME = 13480742887158798
  JULIA_DEPOT_PATH = /home/jrun/data/.julia:/home/jrun/.julia
  JULIARUN_RUN_MODE = script
  JULIA_HOME = /home/jrun/data/.julia
  JULIATEAM_HOSTNAME = umb.juliahub.com
  JULIARUN_RESTART_POLICY = Never
  JULIA_PKG_SERVER = umb.juliahub.com
  JULIA_NUM_THREADS = 8
  JULIA_EDITOR = code
  JULIAHUB_HOME = /opt/juliahub
  FONTCONFIG_PATH = /home/jrun/.julia/artifacts/69ab5e1318fa87cac480350ccc9fafffff3b00c5b/etc
      ↪ /fonts
  JULIA_LOAD_PATH = @:@v#.#:@stdlib:/opt/juliahub/projects/default:/opt/juliahub/projects/
      ↪ default
  HOME = /home/jrun
  JULIA_DATASETS_PATH = /var/run/secrets/jr-lobscda9ogsecret/DATA_TOML:/opt/juliahub/
      ↪ JuliaHubDataDriver.toml:@:
  TERM = xterm-256color
  JULIA_DEPOT_PATH = /home/jrun/data/.julia:/home/jrun/.julia
  LD_LIBRARY_PATH = :/opt/codeserver/lib
  JULIA_HOME = /home/jrun/data/.julia
```

```
JRUN_APP_BASE_PATH = /
PATH = /opt/codeserver/lib/code-server/lib/vscode/bin/remote-cli:/opt/PsN/v5.2.6/bin:/usr/
    ↪ local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
```

A.1 Pumas Version

```
    Status `~/.julia/environments/v1.7/Manifest.toml`
[4ece37e6] Bioequivalence v0.1.17 ⚲
[29142fd5] NCA v2.3.0 ⚲
[b07d0016] NCAUtilities v0.7.4 ⚲
[4f2c3c20] Pumas v2.2.1 ⚲
[90809fef] PumasApps v0.6.11 ⚲
[0c61e9cd] PumasPlots v0.7.6 ⚲
[c743b482] PumasReports v0.5.1 ⚲
[148d11e5] PumasUtilities v0.7.0 ⚲
```

A.2 Project Manifest

```
    Status `~/.julia/environments/v1.7/Manifest.toml`
[a4c015fc] ANSIColoredPrinters v0.0.1 ⚲
[da404889] ARFFFiles v1.4.1 ⚲
[fbe9abb3] AWS v1.74.1
[4f1ea46c] AWSCore v0.6.18
[1c724243] AWSS3 v0.9.5
[0d499d91] AWSSDK v0.5.0
[c3fe647b] AbstractAlgebra v0.23.0 ⚲
[621f4979] AbstractFFTs v1.1.0 ⚲
[80f14c24] AbstractMCMC v3.3.1 ⚲
[6e696c72] AbstractPlutoDingetjes v1.1.4 ⚲
[1520ce14] AbstractTrees v0.3.4 ⚲
[7d9f7c33] Accessors v0.1.19 ⚲
[79e6a3ab] Adapt v3.3.3 ⚲
[0bf59076] AdvancedHMC v0.3.5 ⚲
[cbdf2221] AlgebraOfGraphics v0.6.8 ⚲
[27a7e980] Animations v0.4.1 ⚲
[dce04be8] ArgCheck v2.3.0 ⚲
[ec485272] ArnoldiMethod v0.1.0 ⚲
[4fba245c] ArrayInterface v3.2.2 ⚲
[69666777] Arrow v2.3.0 ⚲
[31f734f8] ArrowTypes v1.2.1 ⚲
[15f4f7f2] AutoHashEquals v0.2.0 ⚲
[67c07d97] Automa v0.8.2 ⚲
[13072b0f] AxisAlgorithms v1.0.1 ⚲
[39de3d68] AxisArrays v0.4.6 ⚲
[fbb218c0] BSON v0.3.5 ⚲
[198e06fe] BangBang v0.3.36 ⚲
[9718e550] Baselet v0.1.1 ⚲
[6e4b80f9] BenchmarkTools v1.3.1 ⚲
[e2ed5e7c] Bijections v0.1.4 ⚲
[c3b6d118] BitIntegers v0.2.6 ⚲
[62783981] BitTwiddlingConvenienceFunctions v0.1.3 ⚲
[fa961155] CEnum v0.4.2 ⚲
[2a0fbf3d] CPUSummary v0.1.22 ⚲
[00ebfdb7] CSTParser v3.3.3 ⚲
[336ed68f] CSV v0.10.4 ⚲
[159f3aea] Cairo v1.0.5 ⚲
```

```
  [13f3f980] CairoMakie v0.8.5 ⚲
  [49dc2e85] Calculus v0.5.1 ⚲
  [479239e8] Catalyst v10.3.1 ⚲
  [324d7699] CategoricalArrays v0.10.6 ⚲
  [9961bab8] Cbc v1.0.1 ⚲
  [8be319e6] Chain v0.4.10 ⚲
  [082447d4] ChainRules v1.35.2 ⚲
  [d360d2e6] ChainRulesCore v1.15.0 ⚲
  [9e997f8a] ChangesOfVariables v0.1.3 ⚲
  [fb6a15b2] CloseOpenIntervals v0.1.8 ⚲
  [523fee87] CodecBzip2 v0.7.2 ⚲
  [5ba52731] CodecLz4 v0.4.0 ⚲
  [944b1d66] CodecZlib v0.7.0 ⚲
  [6b39b394] CodecZstd v0.7.2 ⚲
  [a2cac450] ColorBrewer v0.4.0 ⚲
  [35d6a980] ColorSchemes v3.18.0 ⚲
  [3da002f7] ColorTypes v0.11.4 ⚲
  [c3611d14] ColorVectorSpace v0.9.9 ⚲
  [5ae59095] Colors v0.12.8 ⚲
  [861a8166] Combinatorics v1.0.2 ⚲
  [a80b9123] CommonMark v0.8.6 ⚲
  [38540f10] CommonSolve v0.2.1 ⚲
  [bbf7d656] CommonSubexpressions v0.3.0 ⚲
  [34da2185] Compat v3.45.0 ⚲
  [b152e2b5] CompositeTypes v0.1.2 ⚲
  [a33af91c] CompositionsBase v0.1.1 ⚲
  [ed09eef8] ComputationalResources v0.3.2 ⚲
  [5218b696] Configurations v0.17.3 ⚲
  [88cd18e8] ConsoleProgressMonitor v0.1.2 ⚲
  [187b0558] ConstructionBase v1.3.0 ⚲
  [d38c429a] Contour v0.5.7 ⚲
  [adafc99b] CpuId v0.3.1 ⚲
  [a8cc5b0e] Crayons v4.1.1 ⚲
  [754358af] DEDataArrays v0.2.4 ⚲
  [9a962f9c] DataAPI v1.10.0 ⚲
  [a93c6f00] DataFrames v1.3.4 ⚲
  [1313f7d8] DataFramesMeta v0.11.0 ⚲
  [82cc6244] DataInterpolations v3.9.2 ⚲
  [c9661210] DataSets v0.2.6 ⚲
  [864edb3b] DataStructures v0.18.13 ⚲
  [e2d170a0] DataValueInterfaces v1.0.0 ⚲
  [e7dc6d0d] DataValues v0.4.13 ⚲
  [ab62b9b5] DeepDiffs v1.2.0 ⚲
  [244e2a9f] DefineSingletons v0.1.2 ⚲
  [b429d917] DensityInterface v0.4.0 ⚲
  [85a47980] Dictionaries v0.3.21 ⚲
  [2b5f629d] DiffEqBase v6.78.0 ⚲
  [459566f4] DiffEqCallbacks v2.23.1 ⚲
  [c894b116] DiffEqJump v7.3.1 ⚲
  [163ba53b] DiffResults v1.0.3 ⚲
  [b552c78f] DiffRules v1.11.0 ⚲
  [b4f34e82] Distances v0.10.7 ⚲
  [aaf54ef3] DistributedArrays v0.6.6 ⚲
  [31c24e10] Distributions v0.25.66 ⚲
  [ffbed154] DocStringExtensions v0.8.6 ⚲
  [e30172f5] Documenter v0.27.19 ⚲
  [5b8099bc] DomainSets v0.5.9 ⚲
  [fa6b7ba4] DualNumbers v0.6.8 ⚲
  [7c1d4256] DynamicPolynomials v0.4.5 ⚲
  [792122b4] EarlyStopping v0.1.9 ⚲
```

```
[da5c29d0] EllipsisNotation v1.1.3 ⚲
[d4d017d3] ExponentialUtilities v1.16.0 ⚲
[e2ba6199] ExprTools v0.1.8 ⚲
[55351af7] ExproniconLite v0.6.13 ⚲
[411431e0] Extents v0.1.0 ⚲
[8f5d6c58] EzXML v1.1.0 ⚲
[c87230d0] FFMPEG v0.3.0 ⚲
[7a1cc6ca] FFTW v1.4.6 ⚲
[7034ab61] FastBroadcast v0.1.17 ⚲
[9aa1b823] FastClosures v0.3.2 ⚲
[5789e2e9] FileIO v1.14.0 ⚲
[48062228] FilePathsBase v0.9.15 ⚲
[1a297f60] FillArrays v0.11.9 ⚲
[6a86dc24] FiniteDiff v2.11.1 ⚲
[53c48c17] FixedPointNumbers v0.8.4 ⚲
[59287772] Formatting v0.4.2 ⚲
[f6369f11] ForwardDiff v0.10.32 ⚲
[b38be410] FreeType v4.0.0 ⚲
[663a7486] FreeTypeAbstraction v0.9.9 ⚲
[069b7b12] FunctionWrappers v1.1.2 ⚲
[fb4132e2] FuzzyCompletions v0.5.0 ⚲
[38e38edf] GLM v1.8.0 ⚲
[0c68f7d7] GPUArrays v8.3.2 ⚲
[c145ed77] GenericSchur v0.5.3 ⚲
[cf35fbd7] GeoInterface v1.0.0 ⚲
[5c1252a2] GeometryBasics v0.4.2 ⚲
[bc5e4493] GitHub v5.7.3
[af5da776] GlobalSensitivity v1.3.1 ⚲
[a2bd30eb] Graphics v1.1.2 ⚲
[86223c79] Graphs v1.7.0 ⚲
[3955a311] GridLayoutBase v0.7.7 ⚲
[42e2da0e] Grisu v1.0.2 ⚲
[d5909c97] GroupsCore v0.4.0 ⚲
[19dc6840] HCubature v1.5.0 ⚲
[cd3eb016] HTTP v0.9.17 ⚲
[eafb193a] Highlights v0.4.5 ⚲
[3e5b6fbb] HostCPUFeatures v0.1.7 ⚲
[34004b35] HypergeometricFunctions v0.3.10 ⚲
[ac1192a8] HypertextLiteral v0.9.4 ⚲
[09f84164] HypothesisTests v0.10.10 ⚲
[b5f81e59] IOCapture v0.2.2 ⚲
[7869d1d1] IRTools v0.4.6 ⚲
[615f187c] IfElse v0.1.1 ⚲
[c817782e] ImageBase v0.1.5 ⚲
[a09fc81d] ImageCore v0.9.3 ⚲
[82e4d734] ImageIO v0.6.5 ⚲
[d8c32880] ImageInTerminal v0.4.8 ⚲
[313cdc1a] Indexing v1.1.1 ⚲
[9b13fd28] IndirectArrays v1.0.0 ⚲
[d25df0c9] Inflate v0.1.2 ⚲
[83e8ac13] IniFile v0.5.1 ⚲
[22cec73e] InitialValues v0.3.1 ⚲
[842dd82b] InlineStrings v1.1.2 ⚲
[505f98c9] InplaceOps v0.3.0 ⚲
[18e54dd8] IntegerMathUtils v0.1.0 ⚲
[a98d9a8b] Interpolations v0.13.6 ⚲
[8197267c] IntervalSets v0.5.3 ⚲
[3587e190] InverseFunctions v0.1.7 ⚲
[41ab1584] InvertedIndices v1.1.0 ⚲
[b6b21f68] Ipopt v1.0.2 ⚲
```

```
  [92d709cd] IrrationalConstants v0.1.1 ⌕
  [f1662d9f] Isoband v0.1.1 ⌕
  [c8e1da08] IterTools v1.4.0 ⌕
  [b3c1a2ee] IterationControl v0.4.0 ⌕
  [42fd0dbc] IterativeSolvers v0.9.2 ⌕
  [82899510] IteratorInterfaceExtensions v1.0.0 ⌕
  [692b3bcd] JLLWrappers v1.4.1 ⌕
  [9da8a3cd] JLSO v2.7.0 ⌕
  [682c06a0] JSON v0.21.3 ⌕
  [0f8b85d8] JSON3 v1.9.5 ⌕
  [b9914132] JSONTables v1.0.3 ⌕
  [b835a17e] JpegTurbo v0.1.1 ⌕
  [4076af6c] JuMP v1.1.1 ⌕
  [98e50ef6] JuliaFormatter v0.21.2 ⌕
  [e241c0f9] JuliaHubData v0.3.2 `git@github.com:JuliaComputing/JuliaHubData.jl#v0.3.2`
  [2ddba703] Juniper v0.9.1 ⌕
  [5ab0869b] KernelDensity v0.6.3 ⌕
  [929cbde3] LLVM v4.14.0 ⌕
  [b964fa9f] LaTeXStrings v1.3.0 ⌕
  [2ee39098] LabelledArrays v1.9.0 ⌕
  [23fbe1c1] Latexify v0.15.13 ⌕
  [a5e1c1ea] LatinHypercubeSampling v1.8.0 ⌕
  [73f95e8e] LatticeRules v0.0.1 ⌕
  [10f19ff3] LayoutPointers v0.1.8 ⌕
  [50d2b5c4] Lazy v0.15.1 ⌕
  [fc18253b] LazyJSON v0.2.2
  [8cdb02fc] LazyModules v0.3.1 ⌕
  [7f8f8fb0] LearnBase v0.4.1 ⌕
  [0fc2ff8b] LeastSquaresOptim v0.8.3 ⌕
  [1d6d02ad] LeftChildRightSiblingTrees v0.1.3 ⌕
  [093fc24a] LightGraphs v1.3.5 ⌕
  [d3d80556] LineSearches v7.1.1 ⌕
  [4345ca2d] Loess v0.5.4 ⌕
  [2ab3a3ac] LogExpFunctions v0.3.15 ⌕
  [e6f89c97] LoggingExtras v0.4.9 ⌕
  [bdcacae8] LoopVectorization v0.12.110 ⌕
  [30fc2ffe] LossFunctions v0.7.2 ⌕
  [2fda8390] LsqFit v0.12.1 ⌕
  [c7f686f2] MCMCChains v5.3.1 ⌕
  [be115224] MCMCDiagnosticTools v0.1.3 ⌕
  [6c6e2e6c] MIMEs v0.1.4 ⌕
  [add582a8] MLJ v0.16.11 ⌕
  [a7f614a8] MLJBase v0.18.26 ⌕
  [50ed68f4] MLJEnsembles v0.1.2 ⌕
  [614be32b] MLJIteration v0.3.3 ⌕
  [e80e1ace] MLJModelInterface v1.3.3 ⌕
  [d491faf4] MLJModels v0.14.14 ⌕
  [17bed46d] MLJSerialization v1.1.3 ⌕
  [03970b2e] MLJTuning v0.6.16 ⌕
  [54119dfa] MLJXGBoostInterface v0.2.1 ⌕
  [d8e11817] MLStyle v0.4.12 ⌕
  [1914dd2f] MacroTools v0.5.9 ⌕
  [ee78f7c6] Makie v0.17.5 ⌕
  [20f20a25] MakieCore v0.3.2 ⌕
  [d125e4d3] ManualMemory v0.1.8 ⌕
  [dbb5928d] MappedArrays v0.4.1 ⌕
  [7eb4fadd] Match v1.2.0 ⌕
  [b8f27783] MathOptInterface v1.4.0 ⌕
  [fdba3010] MathProgBase v0.7.8 ⌕
  [0a4f8689] MathTeXEngine v0.4.1 ⌕
```

```
  [739be429] MbedTLS v1.0.3 ⚲
  [f28f55f0] Memento v1.3.1 ⚲
  [c03570c3] Memoize v0.4.4 ⚲
  [e9d8d322] Metatheory v1.3.4 ⚲
  [128add7d] MicroCollections v0.1.2 ⚲
  [e1d29d7a] Missings v1.0.2 ⚲
  [ff71e718] MixedModels v4.6.4 ⚲
  [78c3b35d] Mocking v0.7.3 ⚲
  [961ee093] ModelingToolkit v8.1.0 ⚲
  [4886b29c] MonteCarloIntegration v0.0.3 ⚲
  [e94cdb99] MosaicViews v0.3.3 ⚲
  [99f44e22] MsgPack v1.1.0 ⚲
  [46d2c3a1] MuladdMacro v0.2.2 ⚲
  [f8716d33] MultipleTesting v0.5.1 ⚲
  [102ac46a] MultivariatePolynomials v0.4.6 ⚲
  [ffc61752] Mustache v1.0.13 ⚲
  [d8a4904e] MutableArithmetics v1.0.4 ⚲
  [d41bc354] NLSolversBase v7.8.2 ⚲
  [76087f3c] NLopt v0.6.5 ⚲
  [2774e3e8] NLsolve v4.5.1 ⚲
  [77ba4419] NaNMath v0.3.7 ⚲
  [c020b1a1] NaturalSort v1.0.0 ⚲
  [f09324ee] Netpbm v1.0.2 ⚲
  [8913a72c] NonlinearSolve v0.3.16 ⚲
  [510215fc] Observables v0.5.1 ⚲
  [6fe1bfb0] OffsetArrays v1.12.6 ⚲
  [52e1d378] OpenEXR v0.3.2 ⚲
  [8b6db2d4] OpenML v0.1.1 ⚲
  [429524aa] Optim v1.7.1 ⚲
  [87e2bd06] OptimBase v2.0.2 ⚲
  [bac558e1] OrderedCollections v1.4.1 ⚲
  [1dea7af3] OrdinaryDiffEq v5.71.1 ⚲
  [90014a1f] PDMats v0.11.12 ⚲
  [f57f5aa1] PNGFiles v0.3.16 ⚲
  [19eb6ba3] Packing v0.4.2 ⚲
  [5432bcbf] PaddedViews v0.5.11 ⚲
  [d96e819e] Parameters v0.12.3 ⚲
  [69de0a69] Parsers v2.3.2 ⚲
  [cd433a01] Pavito v0.3.5 ⚲
  [eebad327] PkgVersion v0.1.1 ⚲
  [995b91a9] PlotUtils v1.2.0 ⚲
  [a03496cd] PlotlyBase v0.8.18 ⚲
  [c3e4b0f8] Pluto v0.19.9 ⚲
  [89dfed0f] PlutoSerialization v0.1.2 ⚲
  [e409e4f3] PoissonRandom v0.4.1 ⚲
  [f517fe37] Polyester v0.6.12 ⚲
  [1d0040c9] PolyesterWeave v0.1.5 ⚲
  [647866c9] PolygonOps v0.1.2 ⚲
  [2dfb63ee] PooledArrays v1.4.2 ⚲
  [85a6dd25] PositiveFactorizations v0.2.4 ⚲
  [d236fae5] PreallocationTools v0.2.4 ⚲
  [91cefc8d] PrecompileSignatures v3.0.3 ⚲
  [21216c6a] Preferences v1.3.0 ⚲
  [08abe8d2] PrettyTables v1.3.1 ⚲
  [27ebfcd6] Primes v0.5.2 ⚲
  [33c8b6b6] ProgressLogging v0.1.4 ⚲
  [92933f4c] ProgressMeter v1.7.2 ⚲
  [f8a19df8] PropertyDicts v0.1.2
  [4d266fdc] ProvenanceBase v0.2.0 ⚲
  [4b34888f] QOI v1.0.0 ⚲
```

```
  [1fd47b50] QuadGK v2.4.2 ⚲
  [67601950] Quadrature v1.12.0 ⚲
  [c6596682] QuantileRegressions v0.1.10 ⚲
  [8a4e6c94] QuasiMonteCarlo v0.2.9 ⚲
  [df47a6cb] RData v0.8.3 ⚲
  [ce6b1742] RDatasets v0.7.7 ⚲
  [fb686558] RandomExtensions v0.4.3 ⚲
  [e6cf234a] RandomNumbers v1.5.3 ⚲
  [b3c3ace0] RangeArrays v0.3.2 ⚲
  [c84ed2f1] Ratios v0.4.3 ⚲
  [d71aba96] ReadStat v1.1.1 ⚲
  [52522f7a] ReadStatTables v0.1.1 ⚲
  [c1ae055f] RealDot v0.1.0 ⚲
  [3cdcf5f2] RecipesBase v1.2.1 ⚲
  [731186ca] RecursiveArrayTools v2.21.0 ⚲
  [f2c3362d] RecursiveFactorization v0.2.10 ⚲
  [189a3867] Reexport v1.2.2 ⚲
  [324d217c] ReferenceTests v0.9.11 ⚲
  [42d2dcc6] Referenceables v0.1.2 ⚲
  [29dad682] RegularizationTools v0.6.0 ⚲
  [05181044] RelocatableFolders v0.1.3 ⚲
  [b873ce64] ReplMaker v0.2.7 ⚲
  [ae029012] Requires v1.3.0 ⚲
  [8d208092] ResourceContexts v0.2.0 ⚲
  [20febd7b] Retry v0.4.1
  [37e2e3b7] ReverseDiff v1.14.1 ⚲
  [79098fc4] Rmath v0.7.0 ⚲
  [f2b01f46] Roots v1.4.0 ⚲
  [7e49a35a] RuntimeGeneratedFunctions v0.5.3 ⚲
  [fdea26ae] SIMD v3.4.1 ⚲
  [3cdde19b] SIMDDualNumbers v0.1.1 ⚲
  [94e857df] SIMDTypes v0.1.0 ⚲
  [476501e8] SLEEFPirates v0.6.32 ⚲
  [1bc83da4] SafeTestsets v0.0.1 ⚲
  [7b38b023] ScanByte v0.3.1 ⚲
  [0bca4576] SciMLBase v1.23.1 ⚲
  [321657f4] ScientificTypes v2.3.3 ⚲
  [30f210dd] ScientificTypesBase v2.3.0 ⚲
  [6c6a2e73] Scratch v1.1.0 ⚲
  [91c51154] SentinelArrays v1.3.13 ⚲
  [efcf1570] Setfield v0.8.2 ⚲
  [1277b4bf] ShiftedArrays v1.0.0 ⚲
  [992d4aef] Showoff v1.0.3 ⚲
  [73760f76] SignedDistanceFields v0.4.0 ⚲
  [699a6c99] SimpleTraits v0.9.4 ⚲
  [45858cf5] Sixel v0.1.2 ⚲
  [ed01d8cd] Sobol v1.5.0 ⚲
  [2133526b] SodiumSeal v0.1.1
  [a2af1166] SortingAlgorithms v1.0.1 ⚲
  [47a9eef4] SparseDiffTools v1.21.0 ⚲
  [276daf66] SpecialFunctions v2.1.6 ⚲
  [171d559e] SplittablesBase v0.1.14 ⚲
  [860ef19b] StableRNGs v1.0.0 ⚲
  [cae243ae] StackViews v0.1.1 ⚲
  [aedffcd0] Static v0.4.1 ⚲
  [90137ffa] StaticArrays v1.5.2 ⚲
  [1e83bf80] StaticArraysCore v1.0.1 ⚲
  [64bff920] StatisticalTraits v2.1.0 ⚲
  [82ae8749] StatsAPI v1.4.0 ⚲
  [2913bbd2] StatsBase v0.33.20 ⚲
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  [4c63d2b9] StatsFuns v1.0.1 ⚲
  [3eaba693] StatsModels v0.6.30 ⚲
  [7792a7ef] StrideArraysCore v0.3.10 ⚲
  [88034a9c] StringDistances v0.11.2 ⚲
  [69024149] StringEncodings v0.3.5 ⚲
  [09ab397b] StructArrays v0.6.8 ⚲
  [856f2bd8] StructTypes v1.8.1 ⚲
  [8a913413] Survival v0.2.2 ⚲
  [2da68c74] SymDict v0.3.0
  [d1185830] SymbolicUtils v0.18.2 ⚲
  [0c5d862f] Symbolics v4.2.0 ⚲
  [3783bdb8] TableTraits v1.0.1 ⚲
  [bd369af6] Tables v1.7.0 ⚲
  [9ac5f52a] Tectonic v0.6.1 ⚲
  [62fd8b95] TensorCore v0.1.1 ⚲
  [8ea1fca8] TermInterface v0.2.3 ⚲
  [5d786b92] TerminalLoggers v0.1.5 ⚲
  [8290d209] ThreadingUtilities v0.5.0 ⚲
  [ac1d9e8a] ThreadsX v0.1.10 ⚲
  [731e570b] TiffImages v0.5.5 ⚲
  [f269a46b] TimeZones v1.7.3 ⚲
  [a759f4b9] TimerOutputs v0.5.20 ⚲
  [0796e94c] Tokenize v0.5.24 ⚲
  [3bb67fe8] TranscodingStreams v0.9.6 ⚲
  [28d57a85] Transducers v0.4.73 ⚲
  [84d833dd] TransformVariables v0.6.2 ⚲
  [592b5752] Trapz v2.0.3 ⚲
  [a2a6695c] TreeViews v0.3.0 ⚲
  [d5829a12] TriangularSolve v0.1.11 ⚲
  [410a4b4d] Tricks v0.1.6 ⚲
  [5c2747f8] URIs v1.3.0 ⚲
  [3a884ed6] UnPack v1.0.2 ⚲
  [d9a01c3f] Underscores v3.0.0 ⚲
  [1cfade01] UnicodeFun v0.4.1 ⚲
  [1986cc42] Unitful v1.11.0 ⚲
  [3d5dd08c] VectorizationBase v0.21.33 ⚲
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  [ea10d353] WeakRefStrings v1.4.2 ⚲
  [44d3d7a6] Weave v0.10.10 ⚲
  [efce3f68] WoodburyMatrices v0.5.5 ⚲
  [009559a3] XGBoost v1.5.2 ⚲
  [fdbf4ff8] XLSX v0.7.10 ⚲
  [228000da] XMLDict v0.4.1
  [ddb6d928] YAML v0.4.7 ⚲
  [a5390f91] ZipFile v0.9.4 ⚲
  [e88e6eb3] Zygote v0.6.40 ⚲
  [700de1a5] ZygoteRules v0.2.2 ⚲
  [ae81ac8f] ASL_jll v0.1.3+0 ⚲
  [6e34b625] Bzip2_jll v1.0.6+5 ⚲
  [83423d85] Cairo_jll v1.16.0+6 ⚲
  [38041ee0] Cbc_jll v200.1000.501+0 ⚲
  [3830e938] Cgl_jll v0.6000.300+0 ⚲
  [06985876] Clp_jll v100.1700.601+0 ⚲
  [be027038] CoinUtils_jll v200.1100.400+0 ⚲
  [5ae413db] EarCut_jll v2.2.3+0 ⚲
  [2e619515] Expat_jll v2.4.8+0 ⚲
  [b22a6f82] FFMPEG_jll v4.1.0+3 ⚲
  [f5851436] FFTW_jll v3.3.10+0 ⚲
  [a3f928ae] Fontconfig_jll v2.13.1+14 ⚲
  [d7e528f0] FreeType2_jll v2.10.1+5 ⚲
```

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  [559328eb] FriBidi_jll v1.0.10+0 ⚲
  [78b55507] Gettext_jll v0.21.0+0 ⚲
  [7746bdde] Glib_jll v2.68.3+2 ⚲
  [3b182d85] Graphite2_jll v1.3.14+0 ⚲
  [2e76f6c2] HarfBuzz_jll v2.8.1+1 ⚲
  [905a6f67] Imath_jll v3.1.2+0 ⚲
  [1d5cc7b8] IntelOpenMP_jll v2018.0.3+2 ⚲
  [9cc047cb] Ipopt_jll v300.1400.400+0 ⚲
  [aacddb02] JpegTurbo_jll v2.1.2+0 ⚲
  [c1c5ebd0] LAME_jll v3.100.1+0 ⚲
  [dad2f222] LLVMExtra_jll v0.0.16+0 ⚲
  [1d63c593] LLVMOpenMP_jll v14.0.4+0 ⚲
  [dd4b983a] LZO_jll v2.10.1+0 ⚲
  [dd192d2f] LibVPX_jll v1.10.0+0 ⚲
  [e9f186c6] Libffi_jll v3.2.2+1 ⚲
  [d4300ac3] Libgcrypt_jll v1.8.7+0 ⚲
  [7add5ba3] Libgpg_error_jll v1.42.0+0 ⚲
  [94ce4f54] Libiconv_jll v1.16.1+1 ⚲
  [4b2f31a3] Libmount_jll v2.35.0+0 ⚲
  [38a345b3] Libuuid_jll v2.36.0+0 ⚲
  [5ced341a] Lz4_jll v1.9.3+0 ⚲
  [d00139f3] METIS_jll v5.1.1+0 ⚲
  [856f044c] MKL_jll v2022.0.0+0 ⚲
  [d7ed1dd3] MUMPS_seq_jll v5.4.1+0 ⚲
  [079eb43e] NLopt_jll v2.7.1+0 ⚲
  [e7412a2a] Ogg_jll v1.3.5+1 ⚲
  [656ef2d0] OpenBLAS32_jll v0.3.17+0 ⚲
  [18a262bb] OpenEXR_jll v3.1.1+0 ⚲
  [458c3c95] OpenSSL_jll v1.1.14+0 ⚲
  [efe28fd5] OpenSpecFun_jll v0.5.5+0 ⚲
  [91d4177d] Opus_jll v1.3.2+0 ⚲
  [7da25872] Osi_jll v0.10800.600+0 ⚲
  [2f80f16e] PCRE_jll v8.44.0+0 ⚲
  [36c8627f] Pango_jll v1.42.4+10 ⚲
  [30392449] Pixman_jll v0.40.1+0 ⚲
  [a4dc8951] ReadStat_jll v1.1.5+0 ⚲
  [f50d1b31] Rmath_jll v0.3.0+0 ⚲
  [a5c6f535] XGBoost_jll v1.6.1+1 ⚲
  [02c8fc9c] XML2_jll v2.9.14+0 ⚲
  [aed1982a] XSLT_jll v1.1.34+0 ⚲
  [4f6342f7] Xorg_libX11_jll v1.6.9+4 ⚲
  [0c0b7dd1] Xorg_libXau_jll v1.0.9+4 ⚲
  [a3789734] Xorg_libXdmcp_jll v1.1.3+4 ⚲
  [1082639a] Xorg_libXext_jll v1.3.4+4 ⚲
  [ea2f1a96] Xorg_libXrender_jll v0.9.10+4 ⚲
  [14d82f49] Xorg_libpthread_stubs_jll v0.1.0+3 ⚲
  [c7cfdc94] Xorg_libxcb_jll v1.13.0+3 ⚲
  [c5fb5394] Xorg_xtrans_jll v1.4.0+3 ⚲
  [3161d3a3] Zstd_jll v1.5.2+0 ⚲
  [9a68df92] isoband_jll v0.2.3+0 ⚲
  [0ac62f75] libass_jll v0.14.0+4 ⚲
  [f638f0a6] libfdk_aac_jll v0.1.6+4 ⚲
  [b53b4c65] libpng_jll v1.6.38+0 ⚲
  [075b6546] libsixel_jll v1.8.6+1 ⚲
  [a9144af2] libsodium_jll v1.0.20+0
  [f27f6e37] libvorbis_jll v1.3.7+1 ⚲
  [1270edf5] x264_jll v2019.5.25+2 ⚲
  [dfaa095f] x265_jll v3.0.0+3 ⚲
  [197a6dec] AppServer v0.4.0 ⚲
  [0dad84c5] ArgTools
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  [f43a241f] Downloads
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  [9fa8497b] Future
  [b77e0a4c] InteractiveUtils
  [4af54fe1] LazyArtifacts
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  [76f85450] LibGit2
  [8f399da3] Libdl
  [37e2e46d] LinearAlgebra
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  [b07d0016] NCAUtilities v0.7.4 ⚲
  [ca575930] NetworkOptions
  [d6cf976a] OptimalDesign v0.4.0 ⚲
  [1ceaab83] PharmaDatasets v0.5.0 ⚲
  [44cfe95a] Pkg
  [8b92943f] PlottingUtilities v0.8.2 ⚲
  [de0858da] Printf
  [9abbd945] Profile
  [64b04e06] ProvenanceTracking v0.4.1 ⚲
  [4f2c3c20] Pumas v2.2.1 ⚲
  [90809fef] PumasApps v0.6.11 ⚲
  [0c61e9cd] PumasPlots v0.7.6 ⚲
  [c743b482] PumasReports v0.5.1 ⚲
  [148d11e5] PumasUtilities v0.7.0 ⚲
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  [9a3f8284] Random
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  [9e88b42a] Serialization
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  [6462fe0b] Sockets
  [2f01184e] SparseArrays
  [10745b16] Statistics
  [4607b0f0] SuiteSparse
  [6ce4ecf0] SummaryTables v0.3.2 ⚲
  [fa267f1f] TOML
  [a4e569a6] Tar
  [8dfed614] Test
  [cf7118a7] UUIDs
  [4ec0a83e] Unicode
  [e66e0078] CompilerSupportLibraries_jll
  [deac9b47] LibCURL_jll
  [29816b5a] LibSSH2_jll
  [c8ffd9c3] MbedTLS_jll
  [14a3606d] MozillaCACerts_jll
  [4536629a] OpenBLAS_jll
  [05823500] OpenLibm_jll
  [83775a58] Zlib_jll
  [8e850b90] libblastrampoline_jll
  [8e850ede] nghttp2_jll
  [3f19e933] p7zip_jll
```

B Individual Coefficients Tables

Table 9: Individual parameters of the (FOCE) fit .

id	time	CL	Vc
1	0.0	3.618	49.85
2	0.0	3.711	67.031
3	0.0	3.819	60.845
4	0.0	3.831	76.813
5	0.0	3.793	68.606
6	0.0	3.877	76.768
7	0.0	3.811	73.684
8	0.0	3.697	69.275
9	0.0	3.834	77.922
10	0.0	3.758	64.988
11	0.0	3.79	64.04
12	0.0	3.829	72.911
13	0.0	3.817	71.909
14	0.0	3.74	69.117
15	0.0	3.825	73.07
16	0.0	3.776	70.422
17	0.0	3.723	74.742
18	0.0	3.648	69.098
19	0.0	3.785	66.099
20	0.0	3.844	82.201
21	0.0	3.548	57.037
22	0.0	3.872	77.497
23	0.0	3.668	65.024
24	0.0	3.789	73.277
25	0.0	3.772	72.822
26	0.0	3.833	73.019
27	0.0	3.751	72.776
28	0.0	3.832	78.75
29	0.0	3.779	69.265
30	0.0	3.729	69.919
31	0.0	4.289	54.613
32	0.0	3.771	53.823
33	0.0	3.442	59.967
34	0.0	4.154	65.741
35	0.0	4.557	74.685
36	0.0	4.077	83.714
37	0.0	3.337	55.211
38	0.0	3.068	43.245
39	0.0	4.39	72.907
40	0.0	4.513	82.89
41	0.0	2.907	43.496
42	0.0	3.684	91.234
43	0.0	3.652	85.564
44	0.0	4.305	69.813
45	0.0	3.876	86.74
46	0.0	3.724	77.756
47	0.0	4.157	97.823
48	0.0	3.507	86.964
49	0.0	4.131	88.047
50	0.0	3.765	104.152
51	0.0	4.039	74.625
52	0.0	1.75	56.211
53	0.0	4.071	90.255
54	0.0	3.873	98.99
55	0.0	3.308	54.559
56	0.0	3.656	47.986
57	0.0	3.034	67.78
58	0.0	3.691	108.092
59	0.0	3.934	109.165
60	0.0	3.621	88.715
61	0.0	3.915	79.795
62	0.0	4.249	59.825
63	0.0	3.034	42.552
64	0.0	4.545	128.241
65	0.0	4.102	60.402
66	0.0	2.488	46.803
67	0.0	4.583	57.836

id	time	CL	Vc
68	0.0	3.519	92.14
69	0.0	4.089	91.505
70	0.0	5.585	60.521
71	0.0	3.443	61.242
72	0.0	4.974	66.822
73	0.0	3.063	109.529
74	0.0	3.555	67.002
75	0.0	3.234	113.783
76	0.0	4.275	48.147
77	0.0	5.048	44.717
78	0.0	3.642	92.26
79	0.0	3.163	62.88
80	0.0	2.72	37.653
81	0.0	3.291	66.931
82	0.0	3.687	76.504
83	0.0	4.354	90.519
84	0.0	3.707	61.71
85	0.0	3.455	96.326
86	0.0	3.871	62.472
87	0.0	4.41	48.336
88	0.0	3.176	81.582
89	0.0	3.765	77.234
90	0.0	3.008	73.14
91	0.0	4.096	76.702
92	0.0	2.331	58.493
93	0.0	3.438	79.729
94	0.0	4.262	36.77
95	0.0	3.667	40.304
96	0.0	5.634	57.492
97	0.0	3.554	61.803
98	0.0	2.395	84.49
99	0.0	6.71	99.742
100	0.0	3.544	57.8
101	0.0	3.934	55.857
102	0.0	3.522	76.981
103	0.0	6.052	77.832
104	0.0	1.93	87.96
105	0.0	3.159	69.684
106	0.0	2.801	73.527
107	0.0	3.289	55.984
108	0.0	4.53	55.004
109	0.0	3.656	64.557
110	0.0	3.152	49.546
111	0.0	4.667	70.926
112	0.0	2.631	70.587
113	0.0	5.104	71.424
114	0.0	2.535	52.088
115	0.0	3.409	122.377
116	0.0	5.092	93.111
117	0.0	4.236	48.658
118	0.0	7.766	68.229
119	0.0	3.334	49.432
120	0.0	4.587	59.027

Table 10: Individual parameters of the (FOCE_constantcoef) fit .

id	time	CL	Vc
1	0.0	2.255	51.014
2	0.0	2.043	69.579
3	0.0	2.76	62.688
4	0.0	2.368	80.144
5	0.0	2.38	71.283
6	0.0	2.701	79.766
7	0.0	2.381	76.626
8	0.0	1.995	71.711
9	0.0	2.389	81.232
10	0.0	2.336	67.305
11	0.0	2.503	66.293
12	0.0	2.487	75.796
13	0.0	2.428	74.798
14	0.0	2.099	71.912
15	0.0	2.411	76.16
16	0.0	2.28	73.14
17	0.0	1.947	77.653
18	0.0	1.695	71.821
19	0.0	2.431	68.497
20	0.0	2.332	85.917
21	0.0	1.802	58.443
22	0.0	2.649	80.599
23	0.0	1.993	67.128
24	0.0	2.279	76.204
25	0.0	2.185	75.79
26	0.0	2.505	75.908
27	0.0	2.017	75.987
28	0.0	2.342	82.203
29	0.0	2.358	71.771
30	0.0	2.115	72.445
31	0.0	4.598	54.405
32	0.0	3.563	54.16
33	0.0	2.929	60.766
34	0.0	4.34	65.774
35	0.0	5.7	73.477
36	0.0	4.179	84.125
37	0.0	2.849	55.823
38	0.0	2.581	43.86
39	0.0	5.025	72.494
40	0.0	5.689	81.705
41	0.0	2.381	44.148
42	0.0	3.026	93.09
43	0.0	2.964	87.467
44	0.0	4.745	69.606
45	0.0	3.605	87.756
46	0.0	3.259	78.94
47	0.0	4.542	97.942
48	0.0	2.655	89.026
49	0.0	4.365	88.331
50	0.0	2.969	107.191
51	0.0	4.063	75.0
52	0.0	0.893	57.529
53	0.0	4.181	90.757
54	0.0	3.473	100.695
55	0.0	2.797	55.236
56	0.0	3.413	48.29
57	0.0	2.105	69.481
58	0.0	2.704	111.656
59	0.0	3.635	110.956
60	0.0	2.882	90.689
61	0.0	3.867	80.015
62	0.0	4.318	59.807
63	0.0	2.897	42.733
64	0.0	5.306	126.965
65	0.0	4.126	60.434
66	0.0	2.292	47.111
67	0.0	4.772	57.682

id	time	CL	Vc
68	0.0	3.212	93.118
69	0.0	4.126	91.68
70	0.0	6.235	60.02
71	0.0	3.28	61.55
72	0.0	5.389	66.471
73	0.0	2.404	111.888
74	0.0	3.413	67.275
75	0.0	2.561	116.501
76	0.0	4.327	48.132
77	0.0	5.279	44.57
78	0.0	3.426	92.923
79	0.0	2.956	63.219
80	0.0	2.597	37.787
81	0.0	3.086	67.3
82	0.0	3.561	76.798
83	0.0	4.567	90.398
84	0.0	3.616	61.892
85	0.0	3.122	97.333
86	0.0	3.823	62.601
87	0.0	4.5	48.281
88	0.0	2.834	82.429
89	0.0	3.643	77.595
90	0.0	2.685	73.863
91	0.0	4.104	76.724
92	0.0	2.25	58.683
93	0.0	3.37	79.907
94	0.0	4.272	36.764
95	0.0	3.654	40.318
96	0.0	5.79	57.373
97	0.0	3.52	61.869
98	0.0	2.212	85.217
99	0.0	7.467	98.931
100	0.0	3.51	57.863
101	0.0	3.928	55.875
102	0.0	3.467	77.121
103	0.0	6.385	77.542
104	0.0	1.737	88.779
105	0.0	3.09	69.831
106	0.0	2.707	73.742
107	0.0	3.247	56.051
108	0.0	4.566	54.982
109	0.0	3.63	64.608
110	0.0	3.113	49.6
111	0.0	4.746	70.845
112	0.0	2.531	70.838
113	0.0	5.236	71.313
114	0.0	2.48	52.171
115	0.0	3.261	122.982
116	0.0	5.286	92.933
117	0.0	4.248	48.653
118	0.0	8.601	67.404
119	0.0	3.307	49.461
120	0.0	4.639	58.979

Table 11: Individual parameters of the (LaplaceI) fit .

id	time	CL	Vc
1	0.0	3.612	49.94
2	0.0	3.704	67.182
3	0.0	3.812	60.98
4	0.0	3.824	77.002
5	0.0	3.786	68.766
6	0.0	3.87	76.959
7	0.0	3.804	73.86
8	0.0	3.691	69.431
9	0.0	3.827	78.114
10	0.0	3.752	65.134
11	0.0	3.784	64.186
12	0.0	3.822	73.087
13	0.0	3.81	72.081
14	0.0	3.734	69.276
15	0.0	3.818	73.248
16	0.0	3.769	70.586
17	0.0	3.716	74.916
18	0.0	3.641	69.253
19	0.0	3.778	66.251
20	0.0	3.837	82.407
21	0.0	3.542	57.148
22	0.0	3.865	77.69
23	0.0	3.662	65.165
24	0.0	3.783	73.452
25	0.0	3.765	72.994
26	0.0	3.826	73.196
27	0.0	3.744	72.948
28	0.0	3.825	78.945
29	0.0	3.772	69.426
30	0.0	3.723	70.078
31	0.0	4.285	54.643
32	0.0	3.767	53.848
33	0.0	3.438	60.0
34	0.0	4.149	65.788
35	0.0	4.552	74.754
36	0.0	4.071	83.797
37	0.0	3.333	55.235
38	0.0	3.065	43.258
39	0.0	4.386	72.969
40	0.0	4.507	82.978
41	0.0	2.904	43.509
42	0.0	3.678	91.328
43	0.0	3.647	85.648
44	0.0	4.3	69.868
45	0.0	3.871	86.825
46	0.0	3.719	77.822
47	0.0	4.151	97.945
48	0.0	3.502	87.046
49	0.0	4.126	88.141
50	0.0	3.758	104.285
51	0.0	4.034	74.686
52	0.0	1.746	56.227
53	0.0	4.065	90.356
54	0.0	3.867	99.108
55	0.0	3.304	54.584
56	0.0	3.653	48.005
57	0.0	3.029	67.822
58	0.0	3.684	108.232
59	0.0	3.928	109.311
60	0.0	3.615	88.804
61	0.0	3.913	79.819
62	0.0	4.247	59.836
63	0.0	3.033	42.556
64	0.0	4.54	128.334
65	0.0	4.1	60.413
66	0.0	2.487	46.808
67	0.0	4.581	57.846

id	time	CL	Vc
68	0.0	3.515	92.177
69	0.0	4.086	91.539
70	0.0	5.584	60.533
71	0.0	3.441	61.254
72	0.0	4.972	66.837
73	0.0	3.06	109.582
74	0.0	3.553	67.016
75	0.0	3.23	113.845
76	0.0	4.274	48.152
77	0.0	5.047	44.722
78	0.0	3.639	92.296
79	0.0	3.161	62.891
80	0.0	2.719	37.656
81	0.0	3.289	66.945
82	0.0	3.684	76.524
83	0.0	4.351	90.554
84	0.0	3.705	61.721
85	0.0	3.452	96.365
86	0.0	3.869	62.484
87	0.0	4.409	48.342
88	0.0	3.173	81.607
89	0.0	3.762	77.257
90	0.0	3.006	73.158
91	0.0	4.095	76.708
92	0.0	2.331	58.496
93	0.0	3.437	79.736
94	0.0	4.262	36.77
95	0.0	3.666	40.305
96	0.0	5.634	57.495
97	0.0	3.554	61.806
98	0.0	2.394	84.499
99	0.0	6.709	99.756
100	0.0	3.543	57.803
101	0.0	3.933	55.86
102	0.0	3.521	76.988
103	0.0	6.051	77.839
104	0.0	1.929	87.968
105	0.0	3.159	69.689
106	0.0	2.8	73.532
107	0.0	3.288	55.986
108	0.0	4.53	55.006
109	0.0	3.656	64.56
110	0.0	3.151	49.548
111	0.0	4.666	70.932
112	0.0	2.63	70.592
113	0.0	5.104	71.429
114	0.0	2.534	52.09
115	0.0	3.408	122.4
116	0.0	5.091	93.122
117	0.0	4.235	48.66
118	0.0	7.766	68.234
119	0.0	3.334	49.433
120	0.0	4.587	59.03

Table 12: Individual parameters of the (NaivePooled) fit .

id	time	CL	Vc
1	0.0	NaN	NaN
2	0.0	NaN	NaN
3	0.0	NaN	NaN
4	0.0	NaN	NaN
5	0.0	NaN	NaN
6	0.0	NaN	NaN
7	0.0	NaN	NaN
8	0.0	NaN	NaN
9	0.0	NaN	NaN
10	0.0	NaN	NaN
11	0.0	NaN	NaN
12	0.0	NaN	NaN
13	0.0	NaN	NaN
14	0.0	NaN	NaN
15	0.0	NaN	NaN
16	0.0	NaN	NaN
17	0.0	NaN	NaN
18	0.0	NaN	NaN
19	0.0	NaN	NaN
20	0.0	NaN	NaN
21	0.0	NaN	NaN
22	0.0	NaN	NaN
23	0.0	NaN	NaN
24	0.0	NaN	NaN
25	0.0	NaN	NaN
26	0.0	NaN	NaN
27	0.0	NaN	NaN
28	0.0	NaN	NaN
29	0.0	NaN	NaN
30	0.0	NaN	NaN
31	0.0	NaN	NaN
32	0.0	NaN	NaN
33	0.0	NaN	NaN
34	0.0	NaN	NaN
35	0.0	NaN	NaN
36	0.0	NaN	NaN
37	0.0	NaN	NaN
38	0.0	NaN	NaN
39	0.0	NaN	NaN
40	0.0	NaN	NaN
41	0.0	NaN	NaN
42	0.0	NaN	NaN
43	0.0	NaN	NaN
44	0.0	NaN	NaN
45	0.0	NaN	NaN
46	0.0	NaN	NaN
47	0.0	NaN	NaN
48	0.0	NaN	NaN
49	0.0	NaN	NaN
50	0.0	NaN	NaN
51	0.0	NaN	NaN
52	0.0	NaN	NaN
53	0.0	NaN	NaN
54	0.0	NaN	NaN
55	0.0	NaN	NaN
56	0.0	NaN	NaN
57	0.0	NaN	NaN
58	0.0	NaN	NaN
59	0.0	NaN	NaN
60	0.0	NaN	NaN
61	0.0	NaN	NaN
62	0.0	NaN	NaN
63	0.0	NaN	NaN
64	0.0	NaN	NaN
65	0.0	NaN	NaN
66	0.0	NaN	NaN
67	0.0	NaN	NaN

id	time	CL	Vc
68	0.0	NaN	NaN
69	0.0	NaN	NaN
70	0.0	NaN	NaN
71	0.0	NaN	NaN
72	0.0	NaN	NaN
73	0.0	NaN	NaN
74	0.0	NaN	NaN
75	0.0	NaN	NaN
76	0.0	NaN	NaN
77	0.0	NaN	NaN
78	0.0	NaN	NaN
79	0.0	NaN	NaN
80	0.0	NaN	NaN
81	0.0	NaN	NaN
82	0.0	NaN	NaN
83	0.0	NaN	NaN
84	0.0	NaN	NaN
85	0.0	NaN	NaN
86	0.0	NaN	NaN
87	0.0	NaN	NaN
88	0.0	NaN	NaN
89	0.0	NaN	NaN
90	0.0	NaN	NaN
91	0.0	NaN	NaN
92	0.0	NaN	NaN
93	0.0	NaN	NaN
94	0.0	NaN	NaN
95	0.0	NaN	NaN
96	0.0	NaN	NaN
97	0.0	NaN	NaN
98	0.0	NaN	NaN
99	0.0	NaN	NaN
100	0.0	NaN	NaN
101	0.0	NaN	NaN
102	0.0	NaN	NaN
103	0.0	NaN	NaN
104	0.0	NaN	NaN
105	0.0	NaN	NaN
106	0.0	NaN	NaN
107	0.0	NaN	NaN
108	0.0	NaN	NaN
109	0.0	NaN	NaN
110	0.0	NaN	NaN
111	0.0	NaN	NaN
112	0.0	NaN	NaN
113	0.0	NaN	NaN
114	0.0	NaN	NaN
115	0.0	NaN	NaN
116	0.0	NaN	NaN
117	0.0	NaN	NaN
118	0.0	NaN	NaN
119	0.0	NaN	NaN
120	0.0	NaN	NaN

C Optimization Details

C.1 FOCE

C.1.1 `Optim` Result

```
 * Status: success

 * Candidate solution
    Final objective value:     1.155691e+04

 * Found with
    Algorithm:     BFGS

 * Convergence measures
    |x - x'|               = 9.55e-14 ≰ 0.0e+00
    |x - x'|/|x'|          = 1.95e-14 ≰ 0.0e+00
    |f(x) - f(x')|         = 0.00e+00 ≤ 0.0e+00
    |f(x) - f(x')|/|f(x')| = 0.00e+00 ≤ 0.0e+00
    |g(x)|                 = 3.04e-03 ≰ 1.0e-03

 * Work counters
    Seconds run:   1  (vs limit Inf)
    Iterations:    86
    f(x) calls:    157∇
    f(x) calls:   87
```

C.1.2 `Optim` Trace

```
Iter     Function value   Gradient norm
------   --------------   --------------
     0     1.440263e+06     2.860813e+06
 * time: 0.02217698097229004
     1     2.039860e+05     3.861021e+05
 * time: 0.45118212699890137
     2     1.522624e+05     2.822317e+05
 * time: 0.45679807662963867
     3     7.174846e+04     1.200851e+05
 * time: 0.4623119831085205
     4     4.382050e+04     6.345183e+04
 * time: 0.4687969684600083
     5     2.786632e+04     3.073419e+04
 * time: 0.4746730327606201
     6     2.048095e+04     1.526341e+04
 * time: 0.4813551902770996
     7     1.685589e+04     7.378315e+03
 * time: 0.48793697357177734
     8     1.518391e+04     3.484854e+03
 * time: 0.49519801139831543
     9     1.444885e+04     2.210778e+03
 * time: 0.5025601387023926
    10     1.416149e+04     2.114850e+03
 * time: 0.5105211734771729
    11     1.407003e+04     2.033826e+03
 * time: 0.5183010101318359
    12     1.404852e+04     1.981085e+03
 * time: 0.5258581638336182
```

```
   13     1.404286e+04     1.954007e+03
* time: 0.5339481830596924
   14     1.403687e+04     1.928663e+03
* time: 0.5411410331726074
   15     1.402196e+04     1.879937e+03
* time: 0.7002770900726318
   16     1.398750e+04     1.791595e+03
* time: 0.7057750225067139
   17     1.390880e+04     1.630741e+03
* time: 0.7122621536254883
   18     1.374592e+04     1.375565e+03
* time: 0.7180931568145752
   19     1.341653e+04     1.021601e+03
* time: 0.7246110439300537
   20     1.272257e+04     1.126662e+03
* time: 0.7305810451507568
   21     1.170935e+04     3.210616e+02
* time: 0.7363600730895996
   22     1.167980e+04     4.835757e+02
* time: 0.7412850856781006
   23     1.165445e+04     2.389673e+02
* time: 0.7457740306854248
   24     1.164878e+04     2.223476e+02
* time: 0.7502360343933105
   25     1.164000e+04     1.718785e+02
* time: 0.7549571990966797
   26     1.163961e+04     1.610630e+02
* time: 0.7592079639434814
   27     1.163958e+04     1.584974e+02
* time: 0.7637021541595459
   28     1.163956e+04     1.575221e+02
* time: 0.7681050300598145
   29     1.163949e+04     1.544007e+02
* time: 0.7732231616973877
   30     1.163933e+04     1.500873e+02
* time: 0.78000807762146
   31     1.163888e+04     1.420322e+02
* time: 0.7856299877166748
   32     1.163778e+04     1.284338e+02
* time: 0.7919230461120605
   33     1.163511e+04     1.047367e+02
* time: 0.7975480556488037
   34     1.162920e+04     6.627863e+01
* time: 0.803779125213623
   35     1.161783e+04     6.316742e+01
* time: 0.809326171875
   36     1.160382e+04     5.627766e+01
* time: 0.815852165222168
   37     1.159960e+04     3.923479e+01
* time: 0.8216750621795654
   38     1.159868e+04     3.941155e+01
* time: 0.8274750709533691
   39     1.159865e+04     3.945901e+01
* time: 0.8327670097351074
   40     1.159865e+04     3.946004e+01
* time: 0.8374781608581543
   41     1.159865e+04     3.946293e+01
* time: 0.8430681228637695
   42     1.159863e+04     3.946256e+01
* time: 0.847865104675293
```

```
   43     1.159858e+04     3.945273e+01
* time: 0.8533861637115479
   44     1.159847e+04     3.941479e+01
* time: 0.8589251041412354
   45     1.159816e+04     4.362695e+01
* time: 0.8641681671142578
   46     1.159738e+04     7.253823e+01
* time: 0.8694460391998291
   47     1.159536e+04     1.180528e+02
* time: 0.8748271465301514
   48     1.159049e+04     1.836153e+02
* time: 0.8808059692382812
   49     1.158076e+04     2.513403e+02
* time: 0.8864200115203857
   50     1.156865e+04     2.422771e+02
* time: 0.8920671939849854
   51     1.155954e+04     1.197807e+02
* time: 0.8988111019134521
   52     1.155704e+04     6.159679e+00
* time: 1.1027441024780273
   53     1.155703e+04     3.664210e+00
* time: 1.1080200672149658
   54     1.155703e+04     2.358819e+00
* time: 1.1116909980773926
   55     1.155703e+04     2.367027e+00
* time: 1.1153950691223145
   56     1.155703e+04     2.366877e+00
* time: 1.1180920600891113
   57     1.155703e+04     2.365259e+00
* time: 1.1214931011199951
   58     1.155703e+04     2.362616e+00
* time: 1.1245231628417969
   59     1.155703e+04     2.356429e+00
* time: 1.1280310153961182
   60     1.155703e+04     2.342917e+00
* time: 1.1317729949951172
   61     1.155703e+04     2.310870e+00
* time: 1.1349091529846191
   62     1.155702e+04     3.682413e+00
* time: 1.1388120651245117
   63     1.155701e+04     5.760253e+00
* time: 1.1434061527252197
   64     1.155700e+04     8.227958e+00
* time: 1.147500991821289
   65     1.155697e+04     9.637678e+00
* time: 1.1515450477600098
   66     1.155693e+04     7.497309e+00
* time: 1.1553690433502197
   67     1.155691e+04     2.823799e+00
* time: 1.1597890853881836
   68     1.155691e+04     3.421179e-01
* time: 1.163525104522705
   69     1.155691e+04     1.700411e-02
* time: 1.1673200130462646
   70     1.155691e+04     3.383204e-03
* time: 1.1710419654846191
   71     1.155691e+04     3.056335e-03
* time: 1.1750760078430176
   72     1.155691e+04     3.053250e-03
* time: 1.1803021430969238
```

```
   73     1.155691e+04     3.050196e-03
* time: 1.185469150543213
   74     1.155691e+04     3.047146e-03
* time: 1.1909561157226562
   75     1.155691e+04     3.044099e-03
* time: 1.1963551044464111
   76     1.155691e+04     3.043794e-03
* time: 1.2018179893493652
   77     1.155691e+04     3.043490e-03
* time: 1.207158088684082
   78     1.155691e+04     3.043186e-03
* time: 1.2129809856414795
   79     1.155691e+04     3.042881e-03
* time: 1.2191131114959717
   80     1.155691e+04     3.042577e-03
* time: 1.2258431911468506
   81     1.155691e+04     3.042547e-03
* time: 1.2321240901947021
   82     1.155691e+04     3.042516e-03
* time: 1.238455057144165
   83     1.155691e+04     3.042486e-03
* time: 1.2453961372375488
   84     1.155691e+04     3.042455e-03
* time: 1.251573085784912
   85     1.155691e+04     3.042455e-03
* time: 1.259984016418457
   86     1.155691e+04     3.042455e-03
* time: 1.2684080600738525
```

C.2 FOCE_constantcoef

C.2.1 `Optim` Result

```
* Status: success

* Candidate solution
   Final objective value:     1.170182e+04

* Found with
   Algorithm:     BFGS

* Convergence measures
   |x - x'|               = 1.11e-16 ≰ 0.0e+00
   |x - x'|/|x'|          = 2.26e-17 ≰ 0.0e+00
   |f(x) - f(x')|         = 0.00e+00 ≤ 0.0e+00
   |f(x) - f(x')|/|f(x')| = 0.00e+00 ≤ 0.0e+00
   |g(x)|                 = 1.10e-03 ≰ 1.0e-03

* Work counters
   Seconds run:   1  (vs limit Inf)
   Iterations:    61
   f(x) calls:    102∇
   f(x) calls:   62
```

C.2.2 `Optim` Trace

```
Iter     Function value   Gradient norm
------   --------------   --------------
     0     8.322623e+05     1.650196e+06
 * time: 3.1948089599609375e-5
     1     1.195756e+05     2.220853e+05
 * time: 0.019325971603393555
     2     8.992679e+04     1.623122e+05
 * time: 0.02378702163696289
     3     4.385642e+04     6.887184e+04
 * time: 0.02853107452392578
     4     2.801958e+04     3.623934e+04
 * time: 0.1127159595489502
     5     1.912161e+04     1.738165e+04
 * time: 0.1163170337677002
     6     1.515036e+04     8.464352e+03
 * time: 0.12021112442016602
     7     1.334153e+04     3.924439e+03
 * time: 0.12482690811157227
     8     1.262730e+04     1.700067e+03
 * time: 0.12999606132507324
     9     1.239776e+04     6.316634e+02
 * time: 0.13562893867492676
    10     1.234900e+04     4.948112e+02
 * time: 0.14140605926513672
    11     1.234379e+04     4.928575e+02
 * time: 0.14685702323913574
    12     1.234330e+04     4.922016e+02
 * time: 0.15207695960998535
    13     1.234262e+04     4.912375e+02
 * time: 0.1584489345550537
    14     1.234060e+04     4.883664e+02
 * time: 0.16367292404174805
    15     1.233573e+04     4.814973e+02
 * time: 0.16915607452392578
    16     1.232343e+04     4.644093e+02
 * time: 0.17494797706604004
    17     1.229531e+04     4.359384e+02
 * time: 0.18097710609436035
    18     1.223801e+04     5.856922e+02
 * time: 0.18703913688659668
    19     1.213967e+04     6.696139e+02
 * time: 0.19306397438049316
    20     1.199921e+04     5.908196e+02
 * time: 0.19918203353881836
    21     1.187808e+04     2.433847e+02
 * time: 0.20529699325561523
    22     1.185756e+04     5.937737e+01
 * time: 0.21149396896362305
    23     1.185671e+04     5.849313e+01
 * time: 0.21724700927734375
    24     1.185558e+04     5.611101e+01
 * time: 0.22318601608276367
    25     1.185556e+04     5.579496e+01
 * time: 0.22873401641845703
    26     1.185555e+04     5.571762e+01
 * time: 0.23375391960144043
    27     1.185553e+04     5.550137e+01
 * time: 0.23909997940063477
    28     1.185548e+04     5.518203e+01
 * time: 0.24466204643249512
```

```
   29     1.185536e+04     5.455629e+01
* time: 0.25037193298339844
   30     1.185504e+04     5.339486e+01
* time: 0.256213903427124
   31     1.185423e+04     5.108084e+01
* time: 0.26287007331848145
   32     1.185225e+04     5.277004e+01
* time: 0.26942896842956543
   33     1.184776e+04     5.496425e+01
* time: 0.27620911598205566
   34     1.183882e+04     5.576380e+01
* time: 0.28278493881225586
   35     1.182338e+04     5.352163e+01
* time: 0.28908395767211914
   36     1.179648e+04     4.674698e+01
* time: 0.29551196098327637
   37     1.174145e+04     3.529640e+01
* time: 0.3006000518798828
   38     1.173949e+04     3.630939e+01
* time: 0.3085029125213623
   39     1.173910e+04     3.812972e+01
* time: 0.3143739700317383
   40     1.173909e+04     3.795835e+01
* time: 0.318803071975708
   41     1.173909e+04     3.792305e+01
* time: 0.32317590713500977
   42     1.173906e+04     3.766116e+01
* time: 0.3275439739227295
   43     1.173901e+04     3.730640e+01
* time: 0.33187198638916016
   44     1.173886e+04     3.806980e+01
* time: 0.3363780975341797
   45     1.173849e+04     4.302635e+01
* time: 0.34096407890319824
   46     1.173755e+04     5.020125e+01
* time: 0.3488919734954834
   47     1.173542e+04     5.960206e+01
* time: 0.4600651264190674
   48     1.173103e+04     7.073509e+01
* time: 0.4638540744781494
   49     1.172283e+04     8.115411e+01
* time: 0.4683260917663574
   50     1.170779e+04     6.315828e+01
* time: 0.4720900058746338
   51     1.170530e+04     6.751373e+01
* time: 0.4760739803314209
   52     1.170210e+04     2.133966e+01
* time: 0.48151302337646484
   53     1.170183e+04     2.875487e+00
* time: 0.4859800338745117
   54     1.170182e+04     2.401278e-01
* time: 0.49018096923828125
   55     1.170182e+04     7.006706e-02
* time: 0.49428701400756836
   56     1.170182e+04     7.006706e-02
* time: 0.5060930252075195
   57     1.170182e+04     1.101219e-02
* time: 0.509727954864502
   58     1.170182e+04     1.104048e-03
* time: 0.5130159854888916
```

```
    59     1.170182e+04     1.104048e-03
 * time: 0.5209720134735107
    60     1.170182e+04     1.104048e-03
 * time: 0.5296599864959717
    61     1.170182e+04     1.104048e-03
 * time: 0.5401270389556885
```

C.3 LaplaceI

C.3.1 `Optim` Result

```
 * Status: success

 * Candidate solution
    Final objective value:     1.155697e+04

 * Found with
    Algorithm:     BFGS

 * Convergence measures
    |x - x'|               = 6.85e-05 ≰ 0.0e+00
    |x - x'|/|x'|          = 1.40e-05 ≰ 0.0e+00
    |f(x) - f(x')|         = 2.93e-08 ≰ 0.0e+00
    |f(x) - f(x')|/|f(x')| = 2.54e-12 ≰ 0.0e+00
    |g(x)|                 = 7.17e-04 ≤ 1.0e-03

 * Work counters
    Seconds run:   1  (vs limit Inf)
    Iterations:    72
    f(x) calls:    75∇
    f(x) calls:   73
```

C.3.2 `Optim` Trace

```
Iter     Function value   Gradient norm
------   --------------   --------------
     0     8.322622e+05     1.650196e+06
 * time: 2.4080276489257812e-5
     1     1.195753e+05     2.220854e+05
 * time: 0.028352022171020508
     2     8.992643e+04     1.623123e+05
 * time: 0.03276801109313965
     3     4.385559e+04     6.887194e+04
 * time: 0.03775596618652344
     4     2.801825e+04     3.623953e+04
 * time: 0.04246807098388672
     5     1.911952e+04     1.738190e+04
 * time: 0.04729294776916504
     6     1.514745e+04     8.464374e+03
 * time: 0.05209994316101074
     7     1.333797e+04     3.923856e+03
 * time: 0.05697298049926758
     8     1.262347e+04     1.698887e+03
 * time: 0.06189608573913574
     9     1.239391e+04     6.302124e+02
 * time: 0.06681990623474121
```

```
   10     1.234514e+04     4.958194e+02
* time: 0.0716550350189209
   11     1.233989e+04     4.938755e+02
* time: 0.0763390064239502
   12     1.233935e+04     4.932087e+02
* time: 0.08107709884643555
   13     1.233855e+04     4.921665e+02
* time: 0.085906982421875
   14     1.233622e+04     4.891784e+02
* time: 0.09290909767150879
   15     1.233057e+04     4.819844e+02
* time: 0.10189390182495117
   16     1.231638e+04     4.642274e+02
* time: 0.10982894897460938
   17     1.228390e+04     4.684310e+02
* time: 0.12118697166442871
   18     1.221780e+04     6.293579e+02
* time: 0.13074707984924316
   19     1.210387e+04     7.245375e+02
* time: 0.14236688613891602
   20     1.193758e+04     6.530569e+02
* time: 0.15416908264160156
   21     1.178610e+04     2.785974e+02
* time: 0.16744089126586914
   22     1.175975e+04     7.163647e+01
* time: 0.18593406677246094
   23     1.175877e+04     6.856040e+01
* time: 0.20411396026611328
   24     1.175750e+04     6.032767e+01
* time: 0.21625208854675293
   25     1.175748e+04     5.938602e+01
* time: 0.22914695739746094
   26     1.175747e+04     5.910768e+01
* time: 0.23742008209228516
   27     1.175745e+04     5.834130e+01
* time: 0.24661493301391602
   28     1.175739e+04     5.727396e+01
* time: 0.2570159435272217
   29     1.175722e+04     5.535921e+01
* time: 0.2658529281616211
   30     1.175681e+04     5.246301e+01
* time: 0.2742741107940674
   31     1.175576e+04     5.372471e+01
* time: 0.2825748920440674
   32     1.175319e+04     5.515162e+01
* time: 0.2925279140472412
   33     1.174740e+04     5.625347e+01
* time: 0.3021540641784668
   34     1.173607e+04     5.623956e+01
* time: 0.31627798080444336
   35     1.171667e+04     5.473135e+01
* time: 0.3307631015777588
   36     1.168746e+04     1.077840e+02
* time: 0.34690308570861816
   37     1.168297e+04     1.014565e+02
* time: 0.3648650646209717
   38     1.168043e+04     6.195403e+01
* time: 0.37470293045043945
   39     1.168004e+04     6.849928e+01
* time: 0.6611859798431396
```

```
   40     1.168003e+04     7.017213e+01
* time: 0.6685049533843994
   41     1.168002e+04     7.071076e+01
* time: 0.6748518943786621
   42     1.167994e+04     7.344530e+01
* time: 0.6798598766326904
   43     1.167978e+04     7.677392e+01
* time: 0.6851561069488525
   44     1.167930e+04     8.315217e+01
* time: 0.6904160976409912
   45     1.167807e+04     9.366434e+01
* time: 0.6958301067352295
   46     1.167466e+04     1.134289e+02
* time: 0.7013299465179443
   47     1.166482e+04     1.544974e+02
* time: 0.7064080238342285
   48     1.162833e+04     2.611196e+02
* time: 0.711738109588623
   49     1.159348e+04     2.568444e+02
* time: 0.7208058834075928
   50     1.158382e+04     2.086649e+02
* time: 0.729809045791626
   51     1.157159e+04     6.649206e+01
* time: 0.7349240779876709
   52     1.156399e+04     2.562272e+01
* time: 0.7400228977203369
   53     1.156233e+04     3.949067e+01
* time: 0.7450690269470215
   54     1.156145e+04     1.374917e+01
* time: 0.750269889831543
   55     1.156144e+04     1.372370e+01
* time: 0.7549278736114502
   56     1.156144e+04     1.371717e+01
* time: 0.759239912033081
   57     1.156144e+04     1.371650e+01
* time: 0.7639560699462891
   58     1.156144e+04     1.371458e+01
* time: 0.7690339088439941
   59     1.156144e+04     1.370965e+01
* time: 0.7735230922698975
   60     1.156143e+04     1.369433e+01
* time: 0.7779409885406494
   61     1.156142e+04     1.365213e+01
* time: 0.7826058864593506
   62     1.156138e+04     1.353658e+01
* time: 0.7876889705657959
   63     1.156129e+04     1.323233e+01
* time: 0.7934210300445557
   64     1.156107e+04     1.557782e+01
* time: 0.7983911037445068
   65     1.156054e+04     2.409254e+01
* time: 0.8031580448150635
   66     1.155949e+04     3.223130e+01
* time: 0.8086950778961182
   67     1.155794e+04     2.853719e+01
* time: 0.8136210441589355
   68     1.155707e+04     9.957705e+00
* time: 0.8183670043945312
   69     1.155697e+04     1.559240e+00
* time: 0.8230900764465332
```

```
    70     1.155697e+04     1.347099e-01
 * time: 0.8283169269561768
    71     1.155697e+04     1.304140e-02
 * time: 0.8331859111785889
    72     1.155697e+04     7.174857e-04
 * time: 0.8376889228820801
```

C.4 NaivePooled

C.4.1 `Optim` Result

```
 * Status: success

 * Candidate solution
    Final objective value:     1.226952e+04

 * Found with
    Algorithm:     BFGS

 * Convergence measures
    |x - x'|               = 2.48e-07 ≰ 0.0e+00
    |x - x'|/|x'|          = 4.59e-08 ≰ 0.0e+00
    |f(x) - f(x')|         = 1.38e-10 ≰ 0.0e+00
    |f(x) - f(x')|/|f(x')| = 1.13e-14 ≰ 0.0e+00
    |g(x)|                 = 1.49e-05 ≤ 1.0e-03

 * Work counters
    Seconds run:   0  (vs limit Inf)
    Iterations:    75
    f(x) calls:    79∇
    f(x) calls:   76
```

C.4.2 `Optim` Trace

```
Iter     Function value   Gradient norm
------   --------------   --------------
     0     9.961764e+08     1.991713e+09
 * time: 2.6941299438476562e-5
     1     1.378529e+07     3.494611e+07
 * time: 0.015115022659301758
     2     1.277483e+07     3.258325e+07
 * time: 0.01569390296936035
     3     4.472772e+06     1.233839e+07
 * time: 0.016252994537353516
     4     2.358302e+06     6.697880e+06
 * time: 0.016965866088867188
     5     1.105048e+06     3.063852e+06
 * time: 0.0175478458404541
     6     5.885524e+05     1.400877e+06
 * time: 0.01810002326965332
     7     3.503354e+05     6.854246e+05
 * time: 0.018830060958862305
     8     2.478240e+05     4.800708e+05
 * time: 0.019569873809814453
     9     2.033017e+05     3.907169e+05
 * time: 0.020355939865112305
```

```
   10     1.838453e+05     3.515196e+05
* time: 0.021107912063598633
   11     1.746021e+05     3.327614e+05
* time: 0.021770954132080078
   12     1.689263e+05     3.211118e+05
* time: 0.02235698699951172
   13     1.609999e+05     3.047431e+05
* time: 0.02303791046142578
   14     1.489758e+05     2.801265e+05
* time: 0.023640871047973633
   15     1.244462e+05     2.302312e+05
* time: 0.024229049682617188
   16     9.046800e+04     1.612053e+05
* time: 0.024953842163085938
   17     1.655388e+04     1.738655e+03
* time: 0.025716066360473633
   18     1.643777e+04     1.730026e+03
* time: 0.02649688720703125
   19     1.448515e+04     7.937209e+02
* time: 0.027651071548461914
   20     1.438151e+04     3.991098e+02
* time: 0.029047012329101562
   21     1.435622e+04     1.942627e+02
* time: 0.0300290584564209
   22     1.435259e+04     1.908734e+01
* time: 0.03106403350830078
   23     1.435253e+04     2.367226e+01
* time: 0.03203392028808594
   24     1.435253e+04     2.460034e+01
* time: 0.03291606903076172
   25     1.435253e+04     2.459701e+01
* time: 0.03384804725646973
   26     1.435253e+04     2.404162e+01
* time: 0.03480100631713867
   27     1.435253e+04     2.348296e+01
* time: 0.035513877868652344
   28     1.435253e+04     2.237019e+01
* time: 0.03636598587036133
   29     1.435253e+04     2.070132e+01
* time: 0.037140846252441406
   30     1.435252e+04     1.935679e+01
* time: 0.03789186477661133
   31     1.435251e+04     1.930187e+01
* time: 0.038533926010131836
   32     1.435248e+04     1.923596e+01
* time: 0.039381980895996094
   33     1.435240e+04     1.918964e+01
* time: 0.040125846862792969
   34     1.435219e+04     2.443504e+01
* time: 0.040825843811035156
   35     1.435161e+04     5.711719e+01
* time: 0.04152107238769531
   36     1.434986e+04     1.201920e+02
* time: 0.04233503341674805
   37     1.434197e+04     3.014731e+02
* time: 0.043211936950683594
   38     1.432829e+04     4.373551e+02
* time: 0.04392504692077637
   39     1.428125e+04     7.503443e+02
* time: 0.04475688934326172
```

```
   40     1.423860e+04     1.531092e+03
* time: 0.045326948165893555
   41     1.421149e+04     7.824874e+02
* time: 0.0461578369140625
   42     1.411899e+04     8.680140e+02
* time: 0.04690885543823242
   43     1.395626e+04     1.119431e+03
* time: 0.04769086837768555
   44     1.370291e+04     1.543949e+03
* time: 0.048362016677856445
   45     1.363570e+04     1.498815e+03
* time: 0.04912304878234863
   46     1.342463e+04     1.540102e+03
* time: 0.04975104331970215
   47     1.307036e+04     1.715216e+03
* time: 0.05035090446472168
   48     1.271112e+04     9.703131e+02
* time: 0.0510869026184082
   49     1.259605e+04     8.144024e+02
* time: 0.05166792869567871
   50     1.255870e+04     7.006029e+02
* time: 0.05224490165710449
   51     1.253268e+04     6.669792e+02
* time: 0.05283999443054199
   52     1.253101e+04     7.106772e+02
* time: 0.05342984199523926
   53     1.253097e+04     7.050834e+02
* time: 0.05404996871948242
   54     1.253097e+04     7.058388e+02
* time: 0.05467486381530762
   55     1.253097e+04     7.059500e+02
* time: 0.055574893951416016
   56     1.253097e+04     7.068261e+02
* time: 0.05621600151062012
   57     1.253096e+04     7.078085e+02
* time: 0.0568690299987793
   58     1.253094e+04     7.096506e+02
* time: 0.057420969009399414
   59     1.253088e+04     7.124353e+02
* time: 0.05807185173034668
   60     1.253074e+04     7.169518e+02
* time: 0.058645009994506836
   61     1.253037e+04     7.239592e+02
* time: 0.05919289588928223
   62     1.252939e+04     7.346676e+02
* time: 0.059803009033203125
   63     1.252683e+04     7.500575e+02
* time: 0.060355901718139648
   64     1.252020e+04     7.691388e+02
* time: 0.06097888946533203
   65     1.250349e+04     7.810170e+02
* time: 0.06152796745300293
   66     1.246515e+04     1.024963e+03
* time: 0.06205105781555176
   67     1.239592e+04     1.372448e+03
* time: 0.06277799606323242
   68     1.231269e+04     1.039265e+03
* time: 0.06329488754272461
   69     1.227158e+04     1.749531e+02
* time: 0.06407284736633301
```

```
   70     1.226957e+04     1.393728e+01
* time: 0.06466889381408691
   71     1.226952e+04     5.284865e+00
* time: 0.06529593467712402
   72     1.226952e+04     5.864149e-01
* time: 0.06595706939697266
   73     1.226952e+04     4.783727e-02
* time: 0.06655001640319824
   74     1.226952e+04     1.297811e-03
* time: 0.06712794303894043
   75     1.226952e+04     1.488171e-05
* time: 0.06779599189758301
```