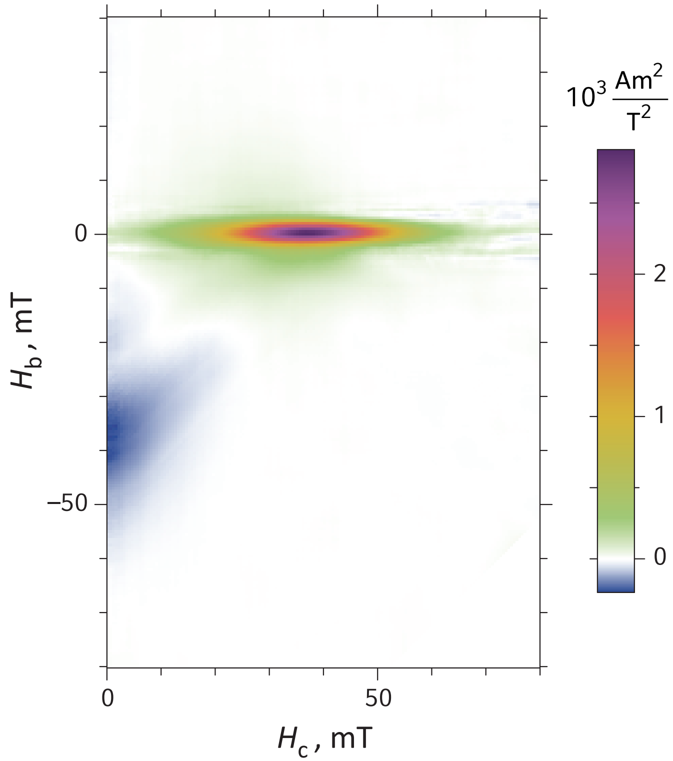
VARIFORC Quick Guide

CalculateFORC



1. Needed files

Mathematica notebook

(→ User manual p. 4-6)

Files ending with `VARIFORC_CalculateFORC.nb`

Location in the installation package:

`VARIFORC_Install/Functions/CalculateFORC/Start_CalculateFORC.nb`

Parameter file

(→ User manual p. 4-15)

Files ending with `VARIFORC_CalculateFORC_parameters.txt`

Location in the installation package:

`VARIFORC_Install/Functions/CalculateFORC/Start_CalculateFORC_Parameters.txt`

Corrected FORC measurements

(→ User manual p. 4-11)

Files produced by ImportFORC, containing corrected FORC measurements (ending with `_CorrectedMeasurements_VARIFORC.frc`) or corrected FORC measurement differences (ending with `_CorrectedMeasurementDifferences_VARIFORC.frc`).

2. Output files

FORC matrix

(→ User manual p. 4-91)

File ending with `_FORC_VARIFORC.txt`

Contains a matrix of FORC values (if INPUT 02 is set to `FORC`) or values of another second derivative of FORC measurements according to INPUT 02.

FORC matrix standard errors

(→ User manual p. 4-91)

File ending with `_FORCStandardError_VARIFORC.txt`

Contains a matrix of FORC standard errors (if INPUT 02 is set to `FORC`) or standard errors of another second derivative of FORC measurements according to INPUT 02.

Backfield coercivity distributions

(→ User manual p. 4-97)

Files ending with `_Backfield_Linear_VARIFORC.txt` (coercivity distribution on a linear field scale) and `_Backfield_Log10_VARIFORC.txt` (coercivity distribution on a $\log_{10}$ field scale).

Contain a list of coercivity distribution values corresponding to the derivative of the backfield demagnetization curve defined by FORC measurements. These files are produced only if INPUT 02 is set to `FORC`.

Reversal field coercivity distributions

(→ User manual p. 4-97)

Files ending with `_Reversal_Linear_VARIFORC.txt` (coercivity distribution on a linear field scale) and `_Reversal_Log10_VARIFORC.txt` (coercivity distribution on a $\log_{10}$ field scale).

Contain a list of coercivity distribution values corresponding to irreversible magnetization processes occurring at reversal fields (i.e. the irreversible component of the upper hysteresis branch). These files are produced only if INPUT 02 is set to `FORC`.

3. Processing parameters

INPUT 01

(→ User manual p. 4-18)

Source data

- Option 1 (*recommended*):
  `FORC`
  Use corrected FORC measurements produced by ImportFORC (file names ending with `_CorrectedMeasurements_VARIFORC.frc`).
- Option 2 (*special cases with processing problems*):
  `DFORC`
  Use corrected FORC measurement differences produced by ImportFORC (file names ending with `_CorrectedMeasurementDifferences_VARIFORC.frc`).

Option 2 is used to process FORC measurements containing a common feature that cannot be fitted correctly with polynomial regression (e.g. step-like magnetization changes).

INPUT 02

(→ User manual p. 4-21)

Output function (updated)

- Option 1 (*default for calculating FORC diagrams*):
  `FORC`
  Used for calculating FORC diagrams.
- Option 2 (*other parameters*):
  `Parameter code`
  Used for calculating a different parameter from FORC measurements.

Option 2 is used for testing purposes only. A full list of parameter codes is given in Table 4.1 of the user manual. Coercivity distributions are calculated only with option 1.

INPUT 03

(→ User manual p. 4-23)

Horizontal FORC output range (updated)

- Option 1 (*recommended*):
  `All`
  The horizontal range of the output FORC diagram coincides with the H_c-range of FORC measurements.
- Option 2 (*explicit specification*):
  `Hcmin, Hcmax`
  The horizontal range of the output FORC diagram is specified by minimum (`Hcmin`) and maximum (`Hcmax`) H_c-values. Limits are expressed in field units of the imported FORC measurements, which can be found in the file header.

Option 1 ensures the maximum possible horizontal extension of the output FORC diagram. It corresponds to the default output of standard FORC processing software. Option 2 is used to define a customized range that excludes insignificant regions of the measured FORC space.

INPUT 04

(→ User manual p. 4-23)

Vertical FORC output range (updated)

- Option 1 (*recommended*):
  `All`
  The vertical range of the output FORC diagram coincides with the maximum H_b-range of FORC measurements.
- Option 2 (*standard*):
  `Rectangle`
  The vertical range of the output FORC diagram is chosen automatically to ensure the largest possible rectangular FORC space that is entirely covered by FORC measurements, with horizontal range as specified by INPUT 03.
- Option 3 (*explicit specification*):
  `Hbmin, Hbmax`
  The vertical range of the output FORC diagram is specified by minimum (`Hbmin`) and maximum (`Hbmax`) H_b-values.

Option 1 ensures the maximum possible vertical extension of the output FORC diagram. Option 2 corresponds to the default output of standard FORC processing software. Option 3 is used to define a customized range that excludes insignificant regions of the measured FORC space. Regions of the rectangular FORC space that are not covered by measurements are automatically completed by zero-padding.

INPUT 05

(→ User manual p. 4-27)

Diagonal trim factor

- Unique option:
  `Trim factor`
  The trim factor is a number comprised between 0 and 1, which controls the trimming of FORC measurements along the lower diagonal limit of the measured FORC space.

A trim factor of 0 means that all FORC measurements are used to calculate the FORC diagram. In this case, FORC values near the lower diagonal limit of the measured FORC space are calculated with partially filled regression rectangles, leading to possible instabilities. Setting the trim factor to 1 ensures that FORC values near the lower diagonal limit of the measured FORC space are calculated with completely filled regression rectangles, sacrificing part of the output range. Trim factors comprised between 0 and 1 represent intermediate cases.

A trim factor of 0.5 is usually sufficient to remove artifacts near the lower diagonal limit of the measured FORC space.

INPUT 06

(→ User manual p. 4-29)

Output mesh size

- Option 1 (*very fast preliminary processing*):
  `Fast`
  The output mesh size is chosen so, that the FORC matrix does not exceed 50 points along each dimension. Recommended for preliminary processing at low resolution.
- Option 2 (*fast preliminary processing*):
  `Coarse`
  Same as option 1, with 100 points.
- Option 3 (*automatic choice for normal processing*):
  `Normal`
  The output mesh size coincides with the mean field step of FORC measurements.
- Option 4 (*automatic choice for high-resolution processing*):
  `Fine`
  The output mesh size is set to half of the mean field step of FORC measurements. Recommended for producing FORC diagrams containing high-resolution features (e.g. ridges).
- Option 5 (*explicit specification*):
  ΔH
  The mesh size of the output FORC matrix is specified by $\Delta H > 0$, in field units of the imported measurements. ΔH should be comprised between $0.5 \times \delta H$ and δH, where δH is the mean field step of FORC measurements.

Option 5 is used to ensure coincident output meshes when combining FORC matrices.

Examples:

- `0.25` is a suitable choice of option 5 in case of FORC measurements with δH = 0.512 mT. Options 3 and 4 would yield ΔH = 0.512 and 0.256 mT, respectively.

INPUT 07

(→ User manual p. 4-32)

Output grid origin

- Option 1 (*automatic, recommended*):
  `Automatic`
  This option creates an output grid with mesh size ΔH by taking the point with FORC coordinates ($\Delta H/2$, 0) as the origin.
- Option 2 (*explicit specification*):
  `Hc0, Hb0`
  The output grid origin is specified explicitly by its FORC coordinates H_c = `Hc0` and H_b = `Hb0`. These coordinates do not need to be part of the output FORC space.

INPUT 06 and INPUT 07 provide a complete control over the exact location of output grid points.

Examples:

- `0, 0` defines an output grid with points located exactly along $H_c = 0$ and $H_b = 0$.

INPUT 08

(→ User manual p. 4-34)

Regularize field measurements (updated)

- Option 1 (*recommended*):
  `No`
  Polynomial regression is performed with measurement points whose coordinates are determined by measured fields.
- Option 2:
  `Yes`
  Polynomial regression is performed with measurement points whose coordinates correspond to an ideal grid determined by the measurement protocol and the mean field step size.

This option does not influence the location of output points.

INPUT 09

(→ User manual p. 4-37)

Weighted margin of polynomial regression rectangles (updated)

- Option 1 (*priority given to regression efficiency*):
  `0`
  All measurement points within regression rectangles are given the same weight. This option maximizes the polynomial regression efficiency, but produces a discontinuous FORC function.
- Option 2 (*compromise between regression efficiency and quality*):
  `1`
  Polynomial regression is based on a rectangular weight function with smooth transition from 0 at the edge of regression rectangles to 1 within a distance δH from the edges, where δH is the step size of FORC measurements. This option represents the best compromise between FORC function continuity and polynomial regression efficiency.
- Option 3 (*priority given to best quality*):
  `2`
  Polynomial regression is based on a rectangular weight function with a smooth transition from 0 at the edge of regression rectangles to 1 within a distance $2\delta H$ from the edges, where δH is the step size of FORC measurements. This option maximizes the continuity of the FORC function, providing results with best quality.

This option does not affect the FORC diagram resolution, since the size of regression rectangles is automatically adapted to the resolution of standard processing (i.e., option 1) with given smoothing factors.

INPUT 10

(→ User manual p. 4-41)

Horizontal smoothing specifications (updated)

- Option 1 (*conventional smoothing*):
  `SF`
  The smoothing factor is specified by a single integer SF ≥ 1, and is the same everywhere in FORC space. The width of regression rectangles is $(2\,\mathrm{SF}+1)\,\delta H$, where δH is the step size of FORC measurements.
- Option 2 (*advanced smoothing*):
  `s0, λ`
  The smoothing factor is specified by two parameters that control its dependence on FORC coordinates. The first parameter, s_0, is the smoothing factor used along $H_c = 0$. The second parameter, $\lambda \geq 0$, controls the rate with which s_0 is increased towards large values of H_c. The horizontal smoothing factor at H_c is then given by $s_c = s_0 + \lambda\, H_c/\delta H$, where δH is the field step of measurements. Recommended values for λ are comprised between 0 and 0.12. The same value of λ should be used for horizontal and vertical smoothing (INPUT 10 and INPUT 11).

Examples:

- `5` produces conventional FORC processing with a constant horizontal smoothing factor SF = 5.
- `5, 0` is equivalent to the previous example.
- `5, 0.07` is an example of advanced smoothing. The horizontal smoothing factor is 5 along $H_c = 0$, and increases at a rate equal to 0.07 towards large values of H_c.

INPUT 11

(→ User manual p. 4-41)

Vertical smoothing specifications (updated)

- Option 1 (*conventional smoothing*):
  `SF`
  The smoothing factor is specified by a single integer SF ≥ 1, and is the same everywhere in FORC space. The height of regression rectangles is (2 SF +1) δH, where δH is the step size of FORC measurements.

- Option 2 (*advanced smoothing*):
  `s0, λ`
  The smoothing factor is specified by two parameters that control its dependence on FORC coordinates. The first parameter, s_0, is the smoothing factor used along $H_b = 0$. The second parameter, $\lambda \geq 0$, controls the rate with which s_0 is increased towards large values of $|H_b|$. The vertical smoothing factor at H_b is then given by $s_b = s_0 + \lambda\,|H_b|/\delta H$, where δH is the field step of measurements. Recommended values for λ are comprised between 0 and 0.12. The same value of λ should be used for horizontal and vertical smoothing (INPUT 10 and INPUT 11).

Examples:

- `5` produces conventional FORC processing with a constant vertical smoothing factor SF = 5.
- `5, 0` is equivalent to the previous example.
- `5, 0.07` is an example of advanced smoothing. The vertical smoothing factor is 5 along $H_b = 0$, and increases at a rate equal to 0.07 towards large values of $|H_b|$.

INPUT 12

(→ User manual p. 4-48)

Horizontal smoothing factor limit at given H_c

- Option 1 (*standard processing*):
  `None`
  This option is used when no particular FORC features require high-resolution processing along a given value of H_c.
- Option 2 (*maximum horizontal resolution at given H_c*):
  `Hc0`
  This option is used when maximum horizontal resolution is needed along a given value of $H_c \neq 0$. In this case, if advanced smoothing was chosen with INPUT 10, the horizontal smoothing factor is minimal at H_c = `Hc0`, and increases when moving away from `Hc0`.
- Option 3 (*smoothing factor limit at given H_c*):
  `Hc0, sc0`
  This option is used when the horizontal smoothing factor needs to be limited along a given value of H_c = `Hc0` in order to resolve a localized feature (e.g. a vertical ridge along $H_c = 0$). In this case, the horizontal smoothing factor is limited to `sc0` for all regression rectangles containing the coordinate H_c = `Hc0`. A continuous transition to the smoothing factor set by INPUT 10 is ensured outside of the limited range.
- Option 4 (*smoothing factor limit at given H_c over given range*):
  `Hc0, sc0, w0`
  Same as option 3, except that the smoothing factor limit extends over H_c = `Hc0` ± `w0`.

Examples:

- `0,3` limits the horizontal smoothing factor to $s_c = 3$ along a vertical ridge centered at $H_c = 0$.
- `0,3,0.1` same as previous example, but the limitation applies over $H_c = 0 \pm 0.1$.

INPUT 13

(→ User manual p. 4-48)

Vertical smoothing factor limit at given H_b

- Option 1 (*standard processing*):
  `None`
  This option is used when no particular FORC features require high-resolution processing along a given value of H_b.

- Option 2 (*maximum vertical resolution at given* H_b):
  `Hb0`
  This option is used when maximum vertical resolution is needed along a given value of $H_b \neq 0$. In this case, if advanced smoothing was chosen with INPUT 11, the vertical smoothing factor is minimal at H_b = `Hb0`, and increases when moving away from `Hb0`.

- Option 3 (*smoothing factor limit at given* H_b):
  `Hb0, sb0`
  This option is used when the vertical smoothing factor needs to be limited along a given value of H_b = `Hb0` in order to resolve a localized feature (e.g. a central ridge along $H_b = 0$). In this case, the vertical smoothing factor is limited to `sb0` for all regression rectangles containing the coordinate H_b = `Hb0`. A continuous transition to the smoothing factor set by INPUT 11 is ensured outside of the limited range.

- Option 4 (*smoothing factor limit at given* H_b *over given range*):
  `Hb0, sb0, w0`
  Same as option 3, except that the smoothing factor limit extends over H_b = `Hb0` ± `w0`.

Examples:

- `0.5,3` limits the vertical smoothing factor to $s_b = 3$ along a central ridge centered at H_b = 0.5 mT.
- `0.5,3,1` same as previous example, but the limitation applies over $H_b = 0.5 \pm 1$ mT.

INPUT 14

(→ User manual p. 4-56)

Smoothing factor limit near coercive fields (new)

- Option 1 (*hysteresis loop is not excessively squared*):
  `None`
  This option is used to process FORC measurements associated with regular hysteresis.
- Option 2 (*automatic smoothing factor limitation along positive and negative coercivity*):
  `Automatic,` s_d
  This option is used to process FORC measurements associated with hysteresis loops that are squared (i.e. with abrupt transitions from positive to negative saturation). In this case, the size of smoothing rectangles is limited along values of H_r and H corresponding to the negative and positive coercive field, respectively. The appropriated position and width of the limiting regions is determined from estimates of the hysteresis loop squareness contained in the corrected measurement file imported for processing. The size of regression rectangles is limited by $\pm s_d \delta H$, where δH is the step size of FORC measurements.
- Option 3 (*manual smoothing factor limitation along positive and negative coercivity*):
  H_{coerc}, s_d, w_d
  This option is equivalent to option 2, except for the fact that the coercive field H_{coerc} and the width w_d of the diagonals along which the size regression rectangles is limited is entered manually. Manual specifications are recommended only if the automatic option (option 2) does not perform in a satisfactory manner or if hysteresis squareness parameter are not contained in the corrected measurement file imported for processing.

Examples:

- `Automatic,3` limits the size of regression rectangles to $\pm 3\,\delta H$ along the diagonals $H_r = -H_{coerc}$ and $H_r = +H_{coerc}$ where H_{coerc} is determined automatically.
- `12,3,2` same as previous example, with H_{coerc} = 12 mT and transition of the hysteresis loop from positive to negative saturation within ± 2 mT.

INPUT 15

(→ User manual p. 4-62)

Diagonal smoothing factor limit at given *H* (updated)

- Option 1 (*no processing problems*):
  `None`
  This option is used to process FORC measurements with no particular problems along the descending diagonal defined by a given measurement field H.

- Option 2 (*high resolution required at a given value of the measurement field*):
  `H, s_d, w_d`
  This option is used for limiting the size of regression rectangles at a given value H of the measurement field (e.g. the remanence diagonal if $H = 0$). In this case, the size limit is set by $\pm s_d \delta H$, where δH is the step size of FORC measurements. The limit is applied within a distance $w_d \geq 0$ from H. This distance must be entered in field units of the corrected measurements, as reported in the header of the imported file.

Option 2 should be used whenever the FORC diagram produced with option 1 shows instabilities along a descending diagonal (typically the remanence diagonal $H_b = -H_c$, in which case $H = 0$). A valid, and often more efficient alternative to option 2 consists in using FORC measurement differences as basis for the calculation of the FORC diagram (INPUT 01 set to `DFORC`). Option 2 is also useful to limit excessive smoothing towards large values of H_c and H_b, as produced by advanced smoothing options of INPUT 10-11. Preliminary processing with INPUT 06 set to `Fast` is recommended for identifying possible processing problems.

Examples:

- `0,3,1` limits the size of regression rectangles over the descending diagonal given by $H = 0$ (i.e. the remanence diagonal $H_b = -H_c$). The limit is given by $\pm 3\,\delta H$ and is applied along $H = 0$ $\pm$ 1 mT.

INPUT 16

(→ User manual p. 4-62)

Diagonal smoothing factor limit at given H_r (updated)

- Option 1 (*no processing problems*):
  `None`
  This option is used to process FORC measurements with no particular problems along the ascending diagonal defined by a given reversal field H_r.
- Option 2 (*high resolution required at a given value of the measurement field*):
  `Hr, sd, wd`
  This option is used for limiting the size of regression rectangles at a given value H_r of the reversal field. In this case, the size limit is set by $\pm s_d\,\delta H$, where δH is the step size of FORC measurements. The limit is applied within a distance $w_d \geq 0$ from H_r. This distance must be entered in field units of the corrected measurements, as reported in the header of the imported file.

Option 2 should be used whenever the FORC diagram produced with option 1 shows instabilities along an ascending diagonal. A valid, and often more efficient alternative to option 2 consists in using FORC measurement differences as basis for the calculation of the FORC diagram (INPUT 01 set to `DFORC`). Option 2 is also useful to limit excessive smoothing towards large values of H_c and H_b, as produced by advanced smoothing options of INPUT 10-11. Preliminary processing with INPUT 06 set to `Fast` is recommended for identifying possible processing problems.

Examples:

- `0,3,1` limits the size of regression rectangles over the ascending diagonal given by $H_r = 0$ (i.e. the diagonal $H_b = +H_c$). The limit is given by $\pm 3\,\delta H$ and is applied along $H_r = 0 \pm 1$ mT.

INPUT 17

(→ User manual p. 4-66)

Mean field correction parameters (new)

- Option 1 (*no mean field correction*):
  `None`
  This option is used to process FORC measurements without applying a mean field correction.
- Option 2 (*mean field correction*):
  `SF, α`
  This option is used for applying a mean field correction to the FORC measurements. This means that the applied measurement field H is replaced by a corrected field $H^i = H + \alpha M$, where M is the measured magnetization. The measured magnetization is interpolated using a constant smoothing factor *SF*, which is typically smaller than the smoothing factor used for FORC processing (i.e., 1 or 2, depending on data quality). Large values of *SF* are not required, because measurement noise is not amplified when interpolating M, unlike the case of the FORC function. The mean field correction coefficient α needs to be expressed by taking proper units into account. If M is a volume magnetization with same unit as H, the coefficient α is unitless and comprised between −1 and +1. Otherwise, the proper limits for α are defined through a proper unit transformation. Positive correction coefficients tend to expand measurement field steps, while negative correction coefficients have the opposite effect.

Examples:

- `1,0.4` applies a positive mean field correction with coefficient α = 0.4 T/mAm^2 if the field is expressed in T and the magnetic moment in mAm^2.
- `1,-0.4` applies a mean field correction that simulates the effect of a positive mean field given by the coefficient α = +0.4.

INPUT 18

(→ User manual p. 4-75)

Error plots and significance threshold (updated)

- Unique option (*signal-to-noise ratio*):

  t

  Signal-to-noise ratio (SNR) plots of the FORC function are generated with a color scale ranging from blue to purple through white, which correspond to the threshold for significant values of the FORC function. The significance threshold is set by t, which is the SNR limit below which the FORC function does not differ significantly from 0. Values of t for 90-99% confidence levels are reported in Table 4.3 of the user manual (p. 4.78). Setting t = 3 ensures a confidence level >99% for all practical smoothing factors (INPUT 10-11). Significant regions of the FORC diagram (SNR > t) are represented with consistent warn tones ranging from yellow to red and purple.

Contouring of significant FORC contributions is possible with the VARIFORC function PlotFORC.

INPUT 19

(→ User manual p. 4-80)

Error matrix size limit

- Unique option:

  n

  Advanced smoothing options produce very large error matrices which might exceed available computer memory. Therefore, the size of error matrices is limited by a positive integer n typically $\gg$100.

Large values of n increase the statistical significance of error calculations, and values ≥ 1000 are practically equivalent to no limits. In general, $n \le 2.5 \times$ RAM, where RAM is the available working memory in MB. Recommended limit with modern computers: n = 2000.

INPUT 20

(→ User manual p. 4-81)

Outlier detection threshold

- Unique option:
  λ
  Measurements with polynomial regression residuals $> \lambda \times \varepsilon$, where ε is the mean quadratic residual, are considered outliers and ignored. Percentages of Gaussian residuals incorrectly considered as outliers are listed in Table 4.4 of the user manual (p. 4.63) for given values of λ. Use $\lambda > 5$ to avoid outlier detection. Recommended values of λ are ≥ 2.5, in which case <1% of Gaussian residuals are mistakenly identified as outliers.

Outliers might have been already eliminated upon importing FORC measurements with ImportFORC.

INPUT 21

(→ User manual p. 4-82)

Clip negative coercivity distribution values

- Option 1 (*recommended*):
  Yes
  Coercivity distributions are usually positive functions. Therefore, negative coercivity distribution amplitudes obtained from FORC data can be considered as noise artifacts. With this option, coercivity distribution plots are clipped to positive values.
- Option 2:
  No
  With this option, coercivity distributions obtained from FORC data are plotted over their entire range of positive and negative amplitudes.

INPUT 21 options have no effects on the exported coercivity distributions.

INPUT 22

(→ User manual p. 4-84)

Confidence interval of coercivity distributions

- Unique option:
  λ
  Coercivity distributions derived from FORC data are plotted with a confidence interval defined as a multiple $\lambda > 0$ of the estimated standard error.

Usual choices are $\lambda = 1$ for very noisy distributions, and $\lambda = 2$ for all other cases.

INPUT 23

(→ User manual p. 4-85)

FORC diagram ticks specifications

- Option 1 (*automatic, recommended*):
  `Automatic`
  FORC diagram ticks are chosen automatically. In this case, H_c- and H_b-ranges are divided into ~10 equal intervals by major ticks.
- Option 2 (*same explicit specification for H_c- and H_b*-ticks):
  `d, n`
  Major ticks are drawn at d-intervals along H_c and H_b, where $d \geq 0$ is expressed in field units of the imported FORC measurements. Each interval is divided into n parts by minor ticks. Theses specifications apply for H_c- and H_b-ticks.
- Option 3 (*different explicit specifications for H_c- and H_b*-ticks):
  d_c, n_c, d_b, n_b
  Major ticks are drawn at d_c-intervals along H_c and d_b-intervals along H_b, where $d_c \geq 0$ and $d_b \geq 0$ are expressed in field units of the imported FORC measurements. Each interval is divided into n_c or n_b parts by minor ticks. This option is used for FORC diagrams with very different H_c- and H_b-ranges.

More plotting options are available with the VARIFORC function PlotFORC.

Examples:

- `10, 5` places major ticks every 10 mT, and minor ticks every 2 mT, if the field unit of imported FORC measurements is mT.
- `10, 5, 3, 3` places major H_c-ticks every 10 mT with minor ticks every 2 mT, and major H_b-ticks every 3 mT with minor ticks every 1 mT, if the field unit of imported FORC measurements is mT.

INPUT 24

(→ User manual p. 4-87)

FORC diagram color saturation

- Option 1 (*automatic, recommended*):
  `Automatic`
  The color scale saturation of plotted FORC diagrams is set to 90% of the maximum saturation. This option is best suited for monitors and printing.
- Option 2 (*explicit specification*):
  S
  The color scale saturation of plotted FORC diagrams is set to a fraction S of the maximum saturation, with $0 \le S \le 1$. Recommended values of S are comprised between 0.8 and 1.

More plotting options are available with the VARIFORC function PlotFORC.

INPUT 25

(→ User manual p. 4-88)

FORC diagram color scale clipping

- Unique option:
  q
  The color scale extends from the q-quantile to the $1 - q$ quantile of all FORC values. FORC values exceeding this range are represented with the same color for minimum and maximum values, respectively. The color scale extends to the whole range of FORC values with $q = 0$. Otherwise, a fraction q of smallest and largest FORC values is clipped.

This option is used to make the color scale less sensitive to very large FORC amplitudes, so that small amplitudes can be represented with sufficient color contrast. Recommended values for q are comprised between 0 and 0.05. INPUT 21 does not affect the exported FORC matrix and is used only for plotting purposes.

Examples:

- `0.02` means that the 2% smallest and largest FORC values are excluded from the color scale range.

Notes: