

NDK_GARCHM_RESID

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- C/C++
- .Net

```
int __stdcall NDK_GARCHM_RESID(double *      pData,
                               size_t       nSize,
                               double       mu,
                               double       flambda,
                               const double * Alphas,
                               size_t       p,
                               const double * Betas,
                               size_t       q,
                               WORD         nInnovationType,
                               double       nu,
                               WORD         retType
                               )
```

Returns an array of cells for the standardized residuals of a given GARCH model.

Returns

status code of the operation

Return values

NDK_SUCCESS Operation successful

NDK_FAILED Operation unsuccessful. See [Macros](#) for full list.

Deprecated:

this function is being replaced by [NDK_GARCHM_FITTED\(\)](#)

Parameters

- | | |
|-----------------------------|---|
| [in] pData | is the univariate time series data (a one dimensional array). |
| [in] nSize | is the number of observations in pData. |
| [in] mu | is the GARCH model conditional mean (i.e. mu). |
| [in] flambda | is the volatility coefficient for the mean. In finance, lambda is referenced as the risk premium. |
| [in] Alphas | are the parameters of the ARCH(p) component model (starting with the lowest lag). |
| [in] p | is the number of elements in Alphas array |
| [in] Betas | are the parameters of the GARCH(q) component model (starting with the lowest lag). |
| [in] q | is the number of elements in Betas array |
| [in] nInnovationType | is the probability distribution function of the innovations/residuals |

(see [INNOVATION_TYPE](#))

- INNOVATION_GAUSSIAN Gaussian Distribution (default)
- INNOVATION_TDIST Student's T-Distribution,
- INNOVATION_GED Generalized Error Distribution (GED)

[in] **nu** is the shape factor (or degrees of freedom) of the innovations/residuals probability distribution function.

[in] **retType** is a switch to select a residuals-type: raw or standardized.
see [RESID_RETVAL_FUNC](#)

Remarks

1. The underlying model is described [here](#).
2. The time series is homogeneous or equally spaced.
3. The time series may include missing values (e.g. #N/A) at either end.
4. The standardized residuals have a mean of zero and a variance of one (1).
5. The GARCH-M model's standardized residuals is defined as:
$$\epsilon_t = \frac{a_t}{\sigma_t}$$

$$a_t = x_t - \mu - \lambda \sigma_t$$
 Where:
 - ϵ_t is the GARCH-M model's standardized residual at time t.
 - a_t is the GARCH-M model's residual at time t.
 - x_t is the value of the time series at time t.
 - μ is the GARCH-M mean.
 - σ_t is the GARCH-M conditional volatility at time t.
 - λ is the volatility coefficient in the conditional mean.
6. The number of parameters in the input argument - alpha - determines the order of the ARCH component model.
7. The number of parameters in the input argument - beta - determines the order of the GARCH component model.

Requirements

Header	SFSDK.H
Library	SFSDK.LIB
DLL	SFSDK.DLL

```
int NDK_GARCHM_RESID(double[] pData,
                    UIntPtr nSize,
                    double mu,
                    double flambda,
                    double[] Alphas,
                    UIntPtr p,
```

Namespace: NumXLAPI
Class: SFSDK
Scope: Public
Lifetime: Static

```

double[] Betas,
UIntPtr q,
short nInnovationType,
double nu,
short retType
)

```

Returns an array of cells for the standardized residuals of a given GARCH model.

Return Value

a value from [NDK_RETCODE](#) enumeration for the status of the call.

NDK_SUCCESS operation successful
 Error Error Code

Deprecated:

this function is being replaced by [NDK_GARCHM_FITTED\(\)](#)

Parameters

- [in] **pData** is the univariate time series data (a one dimensional array).
- [in] **nSize** is the number of observations in pData.
- [in] **mu** is the GARCH model conditional mean (i.e. mu).
- [in] **flambda** is the volatility coefficient for the mean. In finance, lambda is referenced as the risk premium.
- [in] **Alphas** are the parameters of the ARCH(p) component model (starting with the lowest lag).
- [in] **p** is the number of elements in Alphas array
- [in] **Betas** are the parameters of the GARCH(q) component model (starting with the lowest lag).
- [in] **q** is the number of elements in Betas array
- [in] **nInnovationType** is the probability distribution function of the innovations/residuals (see [INNOVATION_TYPE](#))
 - INNOVATION_GAUSSIAN Gaussian Distribution (default)
 - INNOVATION_TDIST Student's T-Distribution,
 - INNOVATION_GED Generalized Error Distribution (GED)
- [in] **nu** is the shape factor (or degrees of freedom) of the innovations/residuals probability distribution function.
- [in] **retType** is a switch to select a residuals-type:raw or standardized. see [RESID_RETVAL_FUNC](#)

Remarks

1. The underlying model is described [here](#).
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4. The standardized residuals have a mean of zero and a variance of one (1).
5. The GARCH-M model's standardized residuals is defined as:
$$a_t = x_t - \mu - \lambda \sigma_t$$
 Where:
 - (ϵ_t) is the GARCH-M model's standardized residual at time t.
 - (a_t) is the GARCH-M model's residual at time t.
 - (x_t) is the value of the time series at time t.
 - (μ) is the GARCH-M mean.
 - (σ_t) is the GARCH-M conditional volatility at time t.
 - (λ) is the volatility coefficient in the conditional mean.
6. The number of parameters in the input argument - alpha - determines the order of the ARCH component model.
7. The number of parameters in the input argument - beta - determines the order of the GARCH component model.

Exceptions

Exception Type	Condition
None	N/A

Requirements

Namespace	NumXLAPI
Class	SFSDK
Scope	Public
Lifetime	Static
Package	NumXLAPI.DLL

Examples

References

- Hamilton, J .D.; [Time Series Analysis](#) , Princeton University Press (1994), ISBN 0-691-04289-6
- Tsay, Ruey S.; [Analysis of Financial Time Series](#) John Wiley & SONS. (2005), ISBN 0-471-690740

See Also

[template("related")]
