

# NDK\_ARMA\_SIM

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- C/C++
- .Net

```
int __stdcall NDK_ARMA_SIM(double mean,
                           double sigma,
                           double *phis,
                           size_t p,
                           double *thetas,
                           size_t q,
                           double *pData,
                           size_t nSize,
                           UINT nSeed,
                           double *retArray,
                           size_t nSteps
                           )
```

Returns an array of cells for the simulated values.

## Returns

status code of the operation

## Return values

**NDK\_SUCCESS** Operation successful

**NDK\_FAILED** Operation unsuccessful. See [Macros](#) for full list.

## Parameters

- [in] **mean** is the ARMA model mean (i.e.  $\mu$ ).
- [in] **sigma** is the standard deviation of the model's residuals/innovations.
- [in] **phis** are the parameters of the AR(p) component model (starting with the lowest lag).
- [in] **p** is the number of elements in phis (order of AR component)
- [in] **thetas** are the parameters of the MA(q) component model (starting with the lowest lag).
- [in] **q** is the number of elements in thetas (order of MA component)
- [in] **pData** are the values of the latest (most recent) observations
- [in] **nSize** is the number elements in pData
- [in] **nSeed** is a number to initialize the pseudorandom number generator.
- [out] **retArray** is the output array to hold nSteps future simulations
- [in] **nSteps** is the number of future steps to simulate for.

## Remarks

1. The underlying model is described [here](#).
2. NDK\_ARMA\_SIM returns an array of one simulation path starting from the end of the input data.

3. The input data argument (i.e. latest observations) is optional. If omitted, an array of zeroes is assumed.
4. The time series is homogeneous or equally spaced.
5. The time series may include missing values (e.g. NaN) at either end.
6. The long-run mean can take any value or be omitted, in which case a zero value is assumed.
7. The residuals/innovations standard deviation (sigma) must be greater than zero.
8. For the input argument - phi:
  - The input argument is optional and can be omitted, in which case no AR component is included.
  - The order of the parameters starts with the lowest lag.
  - The order of the AR component model is solely determined by the order of the last value in the array with a numeric value (vs. missing or error).
9. For the input argument - theta:
  - The input argument is optional and can be omitted, in which case no MA component is included.
  - The order of the parameters starts with the lowest lag.
  - One or more values in the input argument can be missing or an error code (i.e. #NUM!, #VALUE!, etc.).
  - The order of the MA component model is solely determined by the order of the last value in the array with a numeric value (vs. missing or error).

## Requirements

<b>Header</b>	SFSDK.H
<b>Library</b>	SFSDK.LIB
<b>DLL</b>	SFSDK.DLL

## Examples

```
int NDK_ARMA_SIM(double mean,
                 double sigma,
                 double[] phis,
                 UIntPtr p,
                 double[] thetas,
```

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

```
    UIntPtr q,  
    double[] pData,  
    UIntPtr nSize,  
    int      Seed,  
    double[] retArray,  
    UIntPtr nSteps  
)
```

Returns an array of cells for the simulated values.

### Return Value

a value from **NDK\_RETCODE** enumeration for the status of the call.

**NDK\_SUCCESS** operation successful

Error                      Error Code

### Parameters

- [in] **mean**    is the ARMA model mean (i.e.  $\mu$ ).
- [in] **sigma**    is the standard deviation of the model's residuals/innovations.
- [in] **phis**     are the parameters of the AR(p) component model (starting with the lowest lag).
- [in] **p**        is the number of elements in phis (order of AR component)
- [in] **thetas**   are the parameters of the MA(q) component model (starting with the lowest lag).
- [in] **q**        is the number of elements in thetas (order of MA component)
- [in] **pData**    are the values of the latest (most recent) observations
- [in] **nSize**    is the number elements in pData
- [in] **nSeed**    is a number to initialize the pseudorandom number generator.
- [out] **retArray** is the output array to hold nSteps future simulations
- [in] **nSteps**   is the number of future steps to simulate for.

### Remarks

1. The underlying model is described [here](#).
2. **NDK\_ARMA\_SIM** returns an array of one simulation path starting from the end of the input data.
3. The input data argument (i.e. latest observations) is optional. If omitted, an array of zeroes is assumed.
4. The time series is homogeneous or equally spaced.
5. The time series may include missing values (e.g. NaN) at either end.
6. The long-run mean can take any value or be omitted, in which case a zero value is assumed.
7. The residuals/innovations standard deviation ( $\sigma$ ) must be greater than zero.
8. For the input argument - phi:
  - The input argument is optional and can be omitted, in which case no AR component is included.
  - The order of the parameters starts with the lowest lag.
  - The order of the AR component model is solely determined by the order of the last value in the array with a numeric value (vs. missing or error).

9. For the input argument - theta:

- The input argument is optional and can be omitted, in which case no MA component is included.
- The order of the parameters starts with the lowest lag.
- One or more values in the input argument can be missing or an error code (i.e. #NUM!, #VALUE!, etc.).
- The order of the MA component model is solely determined by the order of the last value in the array with a numeric value (vs. missing or error).

**Exceptions**

Exception Type	Condition
None	N/A

**Requirements**

<b>Namespace</b>	NumXLAPI
<b>Class</b>	SFSDK
<b>Scope</b>	Public
<b>Lifetime</b>	Static
<b>Package</b>	NumXLAPI.DLL

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**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

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**See Also**

[template("related")]

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