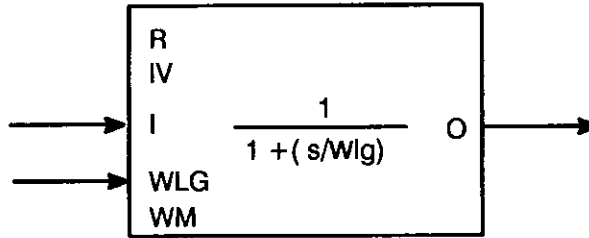


# 43.0 LAG

This function can be used in AutoMax Control Block tasks and UDC Control Block tasks.



## Function

$$\text{LAPLACE TRANSFER FUNCTION} = \frac{1}{1 + (s/\omega g)}$$

## Program Statement

```
CALL LAG(INPUT = input%,           &
         WLG = wlg,                 &
         WM = nnn.n,                &
         INITIAL_VALUE = initial_value%, &
         RESET = reset@,            &
         OUTPUT = output%)          &
```

## Inputs

R (RESET) =

BOOLEAN device reset. The default for this parameter is FALSE. When this parameter is TRUE, OUTPUT will be held at INITIAL\_VALUE.

IV (INITIAL\_VALUE) =

INTEGER initial value. The default for this parameter is zero.

I (INPUT) =

INTEGER signal input. This parameter must be specified. It must be specified as a variable name only (literal value not accepted).

WLG ( $\omega g$ ) =

REAL lag frequency in radians/second. This parameter must be specified. You must include a decimal point in the actual value.

WM ( $\omega_m$ ) =

REAL mapping frequency in radians/second. If specified, this parameter must be entered explicitly as a real literal. The default value for this parameter is  $\omega_s$  divided by 20 where  $\omega_s$  is the frequency in rad/sec. You must include a decimal point in the actual value.

## Outputs

O (OUTPUT) =

INTEGER signal output. This parameter must be specified.

### 43.1 LAG $\omega_m$ Limitations

$\omega_m$  is equal to or greater than 0.0013872 divided by TICKS.

$\omega_m$  is equal to or less than 253.866 divided by TICKS.

$$\begin{aligned}\text{Low Limit} &= \left( \frac{2}{T} \right) \text{ARCTAN} (2^{-18}) \\ &= \left( \frac{2 (2^{-18})}{T} \right) \\ &= \frac{2^{-17}}{T} \\ &= \frac{0.0013872}{\text{TICKS}}\end{aligned}$$

$$\begin{aligned}\text{High Limit} &= \frac{2\pi}{4.5T} \\ &= \frac{253.866}{\text{TICKS}}\end{aligned}$$

where:

T = scan period in seconds  
= number of CPU clock ticks times tick rate  
 $2^{-18}$  = 3.814697266E-06

Refer to section 51.0, Special Coefficient Restrictions, for further restrictions.

## 43.2 LAG $\omega$ lg Limitations

$\omega$ lg is equal to or greater than 0.00137573 divided by TICKS.

$\omega$ lg is equal to or less than 256.055 divided by TICKS.

$$\text{Low Limit} = C(2^{-18})$$

$$= \frac{\omega m(2^{-18})}{\text{TAN}\left(\frac{\omega m \cdot T}{2}\right)}$$

$$\text{High Limit} = 0.71C$$

$$= \frac{0.71\omega m}{\text{TAN}\left(\frac{\omega m \cdot T}{2}\right)}$$

If  $\omega m$  is defaulted ( $Wm = Ws \div 20$ ):

$$\text{Low Limit} = (2^{-18}) \frac{1.9835}{T}$$

$$= \frac{0.00137573}{\text{TICKS}}$$