

This Document is used to determine the *isize* parameter for the 3-2-1-1 multistep with Euler3d.

Select the ARMA model to investigate and set number of modes.

These values represent the highest order model to be investigated.

na = number of aerodynamic terms

nb = number of body displacement terms

nr = number of elastic modes for the model

overdetermined% = the percentage of data points to use to over determine the system, i.e. 400 percent is 4 data points for every parameter. It is best to set this as high as possible within the limits set by computational time.

$na := 2$ $nb := 5$ $nr := 2$ $overdetermined\% := 400$

$$\text{NumPtsNeeded} := \left(nr^2 \cdot nb + na \cdot nr \right) \cdot \frac{\text{overdetermined}\%}{100}$$

$\text{NumPtsNeeded} = 96$ Plus additional steps to help the solution settle.

Find **isize**

$$\text{isize} := \frac{\text{NumPtsNeeded} - 5}{4 \cdot nr + 3}$$

$$\text{NumPtsNeeded} = \text{isize} \cdot (4 \cdot nr + 3) + 5$$

isize should be equal to this.

$$\boxed{\text{isize} = 8}$$

Find **nstp**, the total number of steps used is set above the number needed to capture the entire training signal. This allows the **ARMA** modeling software to use some free response data.

$$\text{nstp} := \text{isize} \cdot (4 \cdot nr + 4) + 5$$

$$\boxed{\text{nstp} = 104}$$

Note: Using larger **isize** will require more total time steps to allow the training signal to finish. The number of time steps needed can be found setting **isize** and solving for **nstp** in the above equation.