

8.2. Step changes in the frequencies of the multi sinusoidal disturbances

The step changes in the frequencies of the multi sinusoidal disturbances can be implemented with the Simulink block “multi sinusoidal disturbances” available in the Simulink Simulator of the active suspension. One can specify 1, 2, or 3 sinusoids, their frequencies and magnitude values, the time of application.

Below the protocol for each multi-sinusoidal disturbance is given (the time schedule will be the same for 1 or for 3 sinusoids).

Step changes protocol:

Disturbance amplitude is **0.1V** for each sinusoid.

T=0 no disturbance, closing of the loop

T=5s application of the first disturbance (1, 2 or 3 sinusoids)

T=8s application of the second disturbance (1, 2 or 3 sinusoids)

T=11s re-application of the first “central” disturbance (1, 2 or 3 sinusoids)

T=14s application of the third disturbance (1, 2 or 3 sinusoids)

T=17s re-application of the first “central” disturbance (1, 2 or 3 sinusoids)

T=32s suppression of the disturbances

T=40s end of the experiment

As indicated in the chapter “Evaluation of the Adaptive Controller” it is expected that the time sequence will remain the same for all the situations but the values of the frequencies may be changed.

Single sinusoidal disturbance (level 1):

The sequences considered for this level are:

60Hz → 70Hz → 60Hz → 50Hz → 60Hz

75Hz → 85Hz → 75Hz → 65Hz → 75Hz

85Hz → 95Hz → 85Hz → 75Hz → 85Hz

Two sinusoidal disturbances (level 2):

The sequences considered for this level are:

[55-75] Hz → [60-80] Hz → [55-75] Hz → [50-70] Hz → [55-75] Hz

[70-90] Hz → [75-95] Hz → [70-90] Hz → [65-85] Hz → [70-90] Hz

Three sinusoidal disturbances (level 3):

The sequences considered for this level are:

[55-70-85] Hz → [60-75-90] Hz → [55-70-85] Hz → [50-65-80] Hz → [55-70-85] Hz

[60-75-90] Hz → [65-80-95] Hz → [60-75-90] Hz → [55-70-85] Hz → [60-75-90] Hz