Custom Input Signal Generation

Folder: ../demos/other possibilities/customInputSignal/

Relavant matlab scripts:

staliro_demo_custom_input_signal.m
CustomInputSignal_FixedTime.m
CustomInputSignal_VarTime.m

In this document, we demonstrate two custom functions for generating input signals for S-TaLiRo. You can run the *staliro_demo_custom_input_signal.m* script which utilizes *CustomInputSignal_FixedTime.m* and *CustomInputSignal_VarTime.m functions.*

Variable Time

We would like generate input signals that have the following characteristics. The input signal should be within a certain range and remain constant for at least 5 seconds. After, the signal is interpolated at varying time points. As an example, we will utilize 9 control points x_1 … x_9.

x_1:   constant state value for at least 5 seconds between 0 and 100
x_2-x_5:   interpolated state values between 0 and 100
x_6-x_9:   varying time control points between 5 and 30 over which x2-x5 are interpolated

Since x_6-x_9 are time control points we have to constrain the search space so that:
1. $x_6 < x_7 < x_8 < x_9$ and
2. for all i, $5 < x_i <= 30$ (which is the total simulation time)

An example signal:
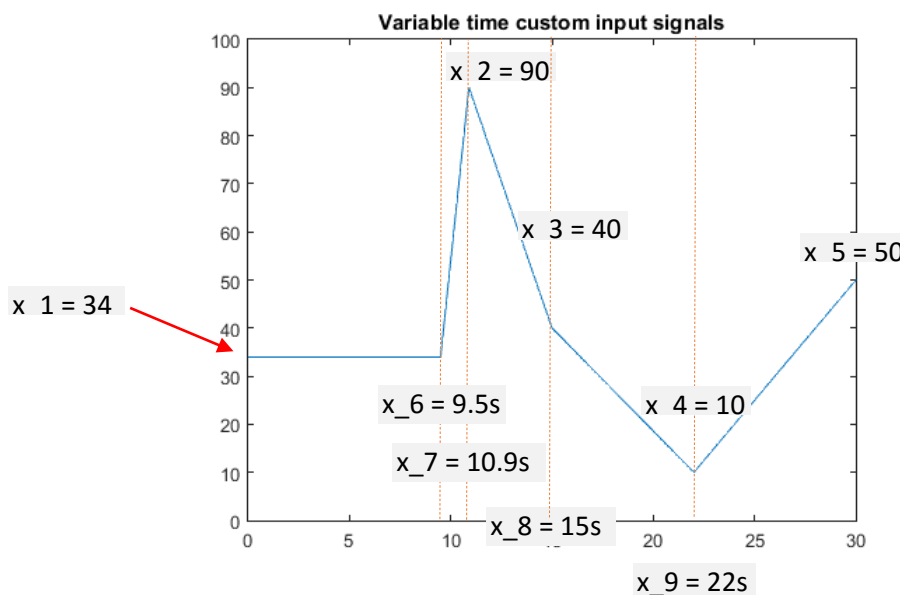
Fixed time

Here, we have similar signal characteristics. The signal should be constant for exactly 5 seconds. After, the signal is interpolated in fixed, equidistant time points over 9 control points x_1 … x_9.

x_1:   constant state value for 5 seconds between 0 and 100
x_2-x_9:   interpolated state values between 0 and 100

An example signal:

x= [x_2… x_9] = [70 85 25 35 50 90 50 60]'