Bridge-string interaction model

Main iterative loop of the computer code that implements the bridge-string interaction model and the vibration of the ideal string. Code is written using Python programming language. Meaning of the used notation is provided in Table 1.

for m in $\operatorname{xrange}(1, M)$: for n in xrange(1, N): ur[n,m] = ur[n-1,m-1]ul[n,m] = ul[n+1,m-1]**if** n == 1: ur[n,m] = -ul[n,m] $if n = N_{-}E:$ ur [n,m] = ur [n,m] + g [m]ul[n,m] = ul[n,m] + g[m] $\mathbf{if} n = N$: ul[n,m] = -ur[n,m]u[n,m] = ur[n,m] + ul[n,m]for n in xrange(1, N_TC): if u[n,m] >= U[n]: $delta_u = u[n,m] - U[n]$ $ur[n,m] = ur[n,m] - delta_u$ u[n,m] = ur[n,m] + ul[n,m] $u\left[\,N_E\,,m\right] ~=~ u\left[\,N_E\,,m\right] ~-~ g\left[m\right]$

m	time point index
n	space point index
Μ	number of time samples
Ν	number of space samples
N_E	index corresponding to the position of the excitation point
N_TC	number of space point dedicated to the bridge
u[n,m]	2D array where string displacement values are stored
ur[n,m]	2D array where amplitudes of the traveling wave moving to the right are stored
ul[n,m]	2D array where amplitudes of the traveling wave moving to the left are stored
g[m]	1D array where values of plucking condition are stored
U[n]	1D array which defines the bridge profile geometry

Table 1: Notations used