## Gripper coordinates Analytical vs numerical solution $\dot{x}$ - analytical [m/s]x direction 0.1 $\dot{x}$ – numerical [m/s]-0.1 $\ddot{x} - analytical \left[ m/s^2 \right]$ -0.2 $\ddot{x} - numerical \left[ m/s^2 \right]$ -0.3 2 3 5 6 time [s] 0.2 $\dot{y} - analytical$ direction [m/s]0 - numerical[m/s]-0.2 $[m/s^{2}]$ $\ddot{y}$ – analytical $[m/s^2]$ >-0.4 $\ddot{y} - numerical$ 0 2 5 6 time [s] <u>×</u>10<sup>-3</sup> direction 0 -10 $\dot{z}$ - analytical [m/s][m/s] $\dot{z}$ - numerical $\ddot{z}$ – analytical $[m/s^{2}]$ $\ddot{z}$ – numerical $[m/s^{2}]$

5

6

-20

2

3

time [s]