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| Wersje barwne znaku / Akademia Górniczo-Hutnicza w Krakowie | Mechatornic system identification  Test 1 |  |

Name ……………………………….. date: 08.05.2025

# Setup

The .mat files contain simulated signals that model setup presented below:

Obraz zawierający szkic, diagram, rysowanie, linia

Zawartość wygenerowana przez sztuczną inteligencję może być niepoprawna.

An antenna transmits “pulse signal” that propagates in the space at the speed of light (c = 300 000 km/s) and is backscattered by scatterers in the air. The received signal is saved as variable “Response”. Sampling frequency is stored in variable “fs”.

# Task 1 (1p)

Plot time waveforms of Pulse and Response. Use proper axes scaling and labeling.

# Task 2s (5p)

Find the distance between the antenna and the arriving targets. Create suitable plots, mark the resulting time lag. Explain the step by step procedure you implemented in your code using comprehensive comments. Copy paste-the code here.

# Task 3 (4p)

Plot spectrum of Pulse and Response. Use proper axes scaling, scale y axis in dB. Find the central frequency and the bandwidth of the pulse signal defined as the with of the main spectral lobe at which the magnitude drops 3 dB from the maximum.