Introduction

EMG signal is the electrical signal associated with muscular contraction. Level of activity of the EMG signal incr signal.

In order to investigate the relationship between an independent variable and a dependent variable, it is commor available, and then to examine the accuracy of the underlying model (goodness of fit). In the present lab assign linear models) to represent the variation of each of the parameters DR, MS, ZCR and TCR as a function of inde

A brief explanation of the parameters:

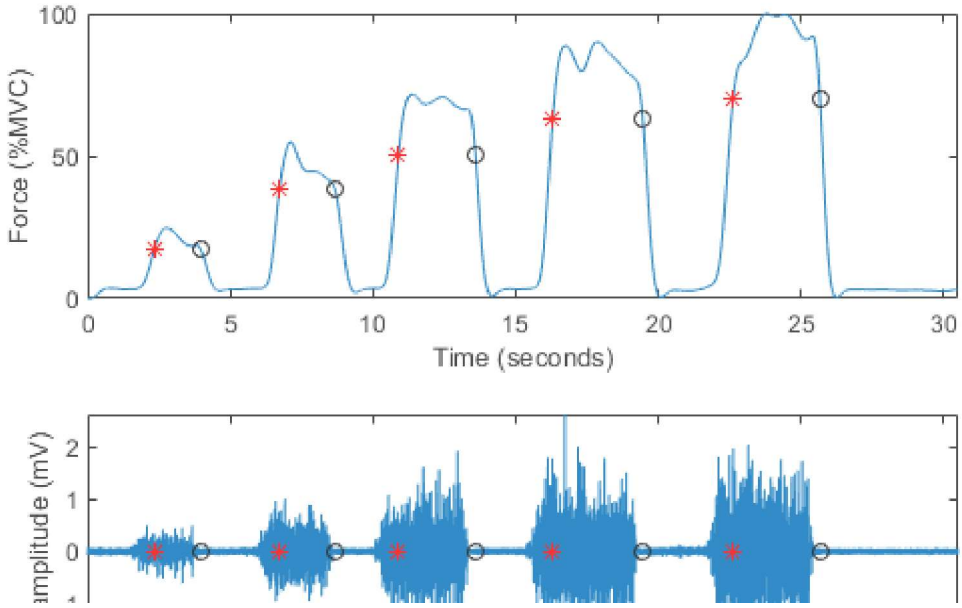
- The dynamic range (DR) of a signal is the difference between its maximum and minimum values over a swing or range.
- The average power of a signal is provided by the mean-squared (MS) value over a specified duration o mean-squared (RMS) value. With the mean of the EMG signal being zero, the RMS value is equal to th
- An approximate indicator of the level of activity in a signal is given by the number of times the signal cr should be subtracted from the signal). A zero crossing is said to occur when the sign of a sample of the of zero crossings over a certain time period is known as the zero-crossing rate (ZCR). It is expected tha larger ZCR. See Section 5.6 on statistical analysis of EMG signals.
- Turns count (TC) is the number of times the signal amplitude changes direction. In Willison method (us selected to avoid counting insignificant fluctuations due to noise. TCR (Turns Count Rate) is the turns c

Data

Muscle force and EMG data from the original experiment are shown in Figure 1. The sampling rate is 2000 Hz f segments have been prepared for the assignment and are available in `data.mat` file. The segments were cropp `1x5 struct` (for the 5 segments), and has the following fields:

- `t`: the time points for the segment
- `force`: muscle force data readily prepared in percent of maximal voluntary contraction
- `EMG`: the EMG data for the segment with its mean (DC) subtracted
- `length`: the number of samples in the segment

You can reach the data with the following syntax: for example `data(2).force` is the force signal from the secor



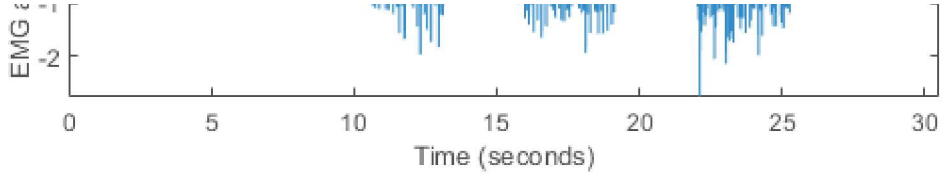


Figure 1. ***Muscle force and EMG signals of the experiment with segment starting and ending points mar maximal voluntary contraction***

Useful MATLAB commands:

hold, max, min, diff, sign, abs, polyfit, polyval, find

Task

Your task is to:

1. Study the data by plotting it with respect to time. I.e. plot all the segments of the already normalized forc *subplot*(2,1,2) against their time corresponding time axes. Your plot will be like Figure 1 above, with Hint: you can plot the 5 segments with separate plot signals (using `hold on`), and keep the segments ir
2. Calculate the average force exerted within each segment of the force signal.
3. Compute the DR for each segment of the EMG signal.

Script

Save Reset MATLAB Documentation (https://www.mathworks.com/help/)

Open Problem in MATLAB Online

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