

## Load data

```
full_data = load('/Users/sachinksalim/Documents/MATLAB/hand_data/S1_AMvel_hand.mat');
info_data = full_data.Infos_;
hand_data = full_data.HandData;
x_pos_data = hand_data.Hand_NormX_;
move_begin_data = hand_data.HmoveBegin_;
move_end_data = hand_data.HmoveEnd_;
```

## Compute indices of right-moving trials

```
DIRECTION_COL_INDEX = 2;
RIGHT_DIR = 4;
LEFT_DIR = 0;

right_dir_indices = find(info_data(:, DIRECTION_COL_INDEX) == RIGHT_DIR);
```

## Compute indices of normal-speed trials

```
SPEED_COL_INDEX = 3;
SLOW_SPEED = 1;
FAST_SPEED = 2;
NORMAL_SPEED = 3;

normal_speed_indices = find(info_data(:, SPEED_COL_INDEX) == NORMAL_SPEED);
```

## Compute indices of valid data

```
valid_move_indices = find(~isnan(move_begin_data) .* ~isnan(move_end_data));
```

## Compute indices of right-moving & normal-speed trials

```
right_dir_normal_speed_indices = intersect(right_dir_indices, normal_speed_indices);
right_dir_normal_speed_indices = intersect(right_dir_normal_speed_indices, valid_move_indices);
```

## Filtering the interested data

```
x_pos = x_pos_data(right_dir_normal_speed_indices, :);
move_begin = move_begin_data(right_dir_normal_speed_indices, :);
move_end = move_end_data(right_dir_normal_speed_indices, :);
hand_info = info_data(right_dir_normal_speed_indices, :);
```

## Computing amplitude, peak velocity and time duration

```
no_of_trials = length(right_dir_normal_speed_indices);
peak_velocity = zeros(no_of_trials, 1);
amplitude = zeros(no_of_trials, 1);
time_duration = zeros(no_of_trials, 1);
TIME_PER_BIN = 1; % 1 millisecond per bin

for index = 1:no_of_trials
```

```
x_pos_relevant = x_pos(index, move_begin(index):move_end(index));
amplitude(index) = max(x_pos_relevant) - min(x_pos_relevant);
velocity_vec = diff(x_pos_relevant)/TIME_PER_BIN;
peak_velocity(index) = abs(max(velocity_vec) - min(velocity_vec));
time_duration(index) = (move_end(index) - move_begin(index))*TIME_PER_BIN;
end
```

### Grouping data based on 6cm and 13cm amplitudes

```
AMPLITUDE_COL_INDEX = 5;
indices_6cm = find(hand_info(:, AMPLITUDE_COL_INDEX) == 6);
indices_13cm = find(hand_info(:, AMPLITUDE_COL_INDEX) == 13);

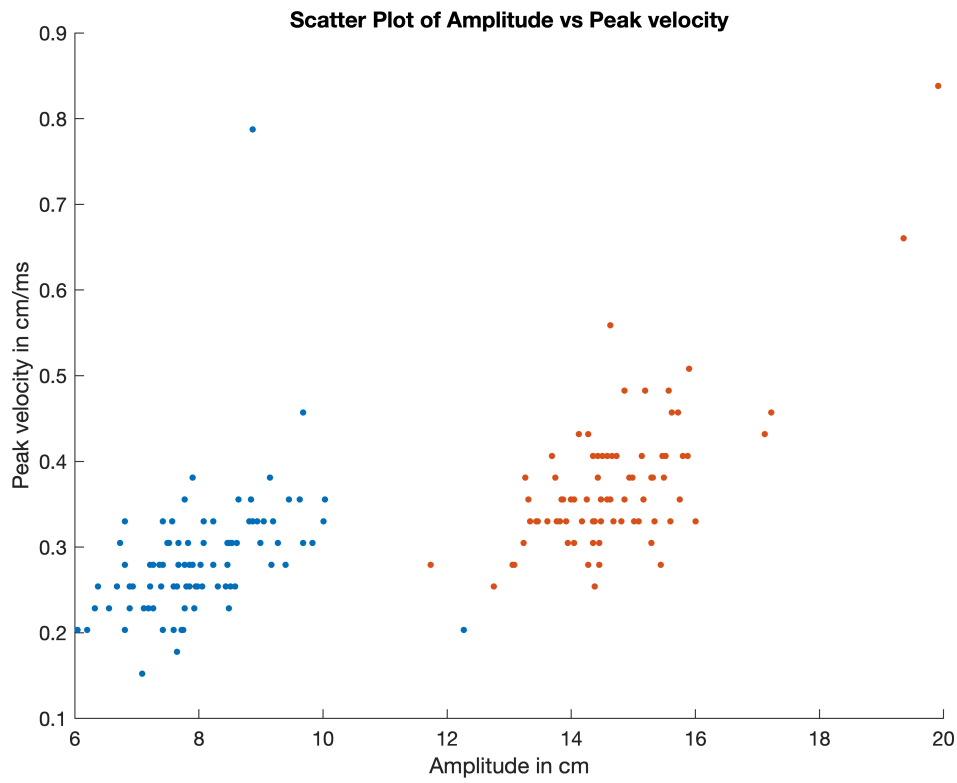
amplitude_6cm = amplitude(indices_6cm);
amplitude_13cm = amplitude(indices_13cm);

peak_velocity_6cm = peak_velocity(indices_6cm);
peak_velocity_13cm = peak_velocity(indices_13cm);

time_duration_6cm = time_duration(indices_6cm);
time_duration_13cm = time_duration(indices_13cm);
```

### Plotting the main-sequence of amplitude vs peak velocity and amplitude vs time duration

```
scatter(amplitude_6cm, peak_velocity_6cm, 10, "filled");
hold on;
scatter(amplitude_13cm, peak_velocity_13cm, 10, "filled");
title('Scatter Plot of Amplitude vs Peak velocity');
xlabel('Amplitude in cm') ;
ylabel('Peak velocity in cm/ms');
hold off;
```



```
scatter(amplitude_6cm, time_duration_6cm, 10, "filled");  
hold on;  
scatter(amplitude_13cm, time_duration_13cm, 10, "filled");  
title('Scatter Plot of Amplitude vs Duration');  
xlabel('Amplitude in cm');  
ylabel('Duration in ms');
```

