LAMPIRAN

LAMPIRAN 1 – Kode Script MATLAB untuk Akuisisi Data menggunakan National Instrument NI 9234

```
%Script untuk menjalankan akuisisi data menggunakan
National Instrument NI 9234
%Created: Maret 2017, Zabir Agusti Maulana

clear all;
clc;
close all;



tic;

s = daq.createSession('ni');
s.DurationInSeconds = 30;   % waktu merekam untuk 1 file
Dur = s.DurationInSeconds;
s.Rate = 17066;   % sampling rate (kecepatan sampling Hz)
s.addAnalogInputChannel('cDAQ1Mod1', 'ai0',
'Accelerometer');
s.addAnalogInputChannel('cDAQ1Mod1', 'ai1',
'Accelerometer');
%s.addAnalogInputChannel('cDAQ1Mod1', 'ai2',
'Accelerometer');
%s.addAnalogInputChannel('cDAQ1Mod1', 'ai3', 'Voltage');
% Tachometer
%s.addAnalogInputChannel('cDAQ1Mod2', 'ai0',
'Microphone');
%s.addAnalogInputChannel('cDAQ1Mod2', 'ai1',
'Microphone');

s.Channels(1).Sensitivity = 100.1E-3; %mV/g Type 4507B
serial:11165
s.Channels(2).Sensitivity = 97.60E-3; %mV/g Type 4507B
serial:11026
%s.Channels(3).Sensitivity = 99.56E-3; %mV/g Type 4507B
serial:10984
%s.Channels(4).Sensitivity = 94.50E-3;
```

```
%s.Channels(5).Sensitivity = 9.40E-3;  %mV/Pa Model
130B40 serial:41741
%s.Channels(6).Sensitivity = 8.60E-3;  %mV/Pa Model
130B40 serial:41842

for i=1:50          % banyaknya file yg direkam

data = s.startForeground();           % start recording
vibration data
data_ch1 = data(:,1);
data_ch2 = data(:,2);
%data_ch3 = data(:,3);
%data_ch4 = data(:,4);
%data_ch5 = data(:,5);
%data_ch6 = data(:,6);

rootname = 'D:\Normal\';      % drive tujuan dan nama
file
extension = '.mat';
% ekstension utk nama file
namafile =
[rootname,'Pompa_Normal',num2str(i),extension];
data_all = [data_ch1 data_ch2];
eval(['save ', namafile ,' data_all']);

pause(3)              % jeda waktu antar rekaman file
pesan = ['Acquiring and saving data at loop number:
',num2str(i)];
disp(pesan)
end

toc
```

LAMPIRAN 2 – Kode Script MATLAB *Fast Fourier Transform (FFT).*

```
clear
clc
close all

%load('C:\Users\Berli\Documents\Kuliah Monitoring\Sem1
2016_17\Bearing_fault\Outer_race_fault_29hz.mat');
load('D:\TUGAS AKHIR\data
penelitian\normal\pompa_normal40.mat');

y=data_all(:,1);
%y=data_all(:,1);
sampling_rate=17066; %kecepatan sampling Hz
recording_time=30;   %waktu perekaman data (recording
time)
L=sampling_rate*recording_time;  %panjang data (length of
signal)

NFFT = 2^nextpow2(L); % Next power of 2 from length of y
Y = fft(y,NFFT)/L;
f = sampling_rate/2*linspace(0,1,NFFT/2+1);

% plot amplitude time domain
figure
plot(y(1:2*17066),'color','b')
axis ([0 1381 -15 20]);
title('Time Waveform Impeler Normal')
xlabel('samples')
ylabel ('Amplitude')

% Plot single-sided amplitude spectrum.
plot(f,2*abs(Y(1:NFFT/2+1)),'color','b')
axis ([0 350 0 0.5]);
title('Spektrum Impeler Normal')
xlabel('Frequency (Hz)')
ylabel('Amplitude')
```

```
analy=hilbert(data_all(:,1));
%analy=hilbert(data_all(:,1));
y=abs(analy);
NFFT = 2^nextpow2(L); % Next power of 2 from length of y
Y = fft(y,NFFT)/L;
f = sampling_rate/2*linspace(0,1,NFFT/2+1);

figure
plot(f,2*abs(Y(1:NFFT/2+1)))
title('Envelope Detection Using Hilbert Transform')
xlabel('Frequency (Hz)')
ylabel('|Y(f)|')
```

LAMPIRAN 3 – Kode Script MATLAB Perbandingan Data Normal dan Rusak.

```
clear
clc
close all

%load('C:\Users\Berli\Documents\Kuliah Monitoring\Sem1
2016_17\Bearing_fault\Outer_race_fault_29hz.mat');
load('D:\TUGAS AKHIR\data
penelitian\Normal\pompa_Normal40.mat');
y=data_all(:,1);
%y=data_all(:,1);
sampling_rate=17066; %kecepatan sampling Hz
recording_time=30;   %waktu perekaman data (recording
time)
L=sampling_rate*recording_time;  %panjang data (length of
signal)


NFFT = 2^nextpow2(L); % Next power of 2 from length of y
Y = fft(y,NFFT)/L;
f = sampling_rate/2*linspace(0,1,NFFT/2+1);



% Plot single-sided amplitude spectrum.
figure
subplot (2,1,1)
plot(f,2*abs(Y(1:NFFT/2+1)),'color','b')
axis ([0 350 -0.002 0.5]);
title('Spektrum Impeler Normal')
xlabel('Frequency (Hz)')
ylabel('Amplitude')

%load('C:\Users\Berli\Documents\Kuliah Monitoring\Sem1
2016_17\Bearing_fault\Outer_race_fault_29hz.mat');
load('D:\TUGAS AKHIR\data
penelitian\Rusak1\impeler_rusak140.mat');
y=data_all(:,1);
%y=data_all(:,1);
sampling_rate=17066; %kecepatan sampling Hz
```

```
recording_time=30;   %waktu perekaman data (recording
time)
L=sampling_rate*recording_time;  %panjang data (length of
signal)


NFFT = 2^nextpow2(L); % Next power of 2 from length of y
Y = fft(y,NFFT)/L;
f = sampling_rate/2*linspace(0,1,NFFT/2+1);


% Plot single-sided amplitude spectrum.
subplot (2,1,2)
plot(f,2*abs(Y(1:NFFT/2+1)),'color','r')
axis ([0 350 -0.002 0.5]);
title('Spektrum Impeler Rusak Tipe I')
xlabel('Frequency (Hz)')
ylabel('Amplitude')


analy=hilbert(data_all(:,1));
%analy=hilbert(data_all(:,1));
y=abs(analy);
NFFT = 2^nextpow2(L); % Next power of 2 from length of y
Y = fft(y,NFFT)/L;
f = sampling_rate/2*linspace(0,1,NFFT/2+1);
```