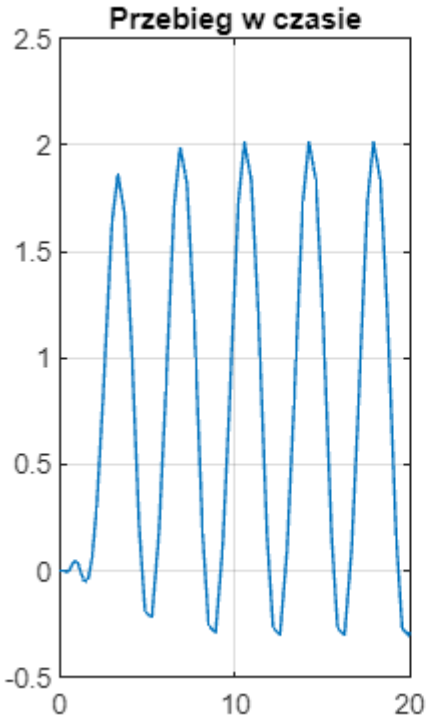
Sprawozdanie - WEAIiIB			
Podstawy automatyki 2			
Ćwiczenie 8: Układ regulacji dwupołożeniowej cz2			
Czwartek godz.	14:30	Data wykonania:	04.05.2023
Imię i nazwisko:	Jan Rosa	Data zaliczenia:	
		Ocena:	

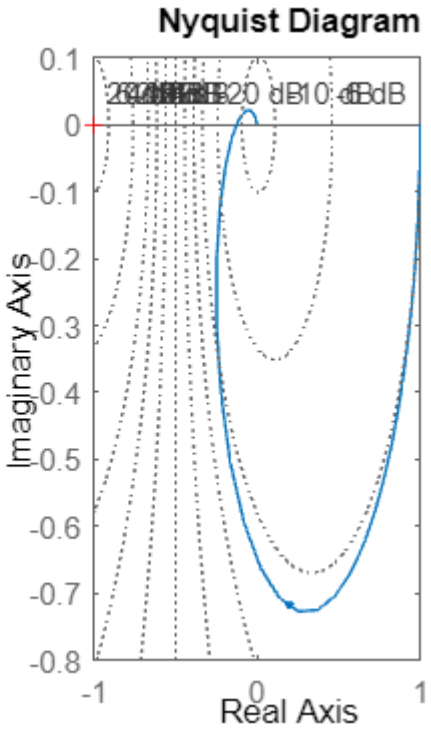
Wstęp

Celem niniejszego sprawozdania jest zbadanie stabilności układu regulacji z liniowym obiektem i nieliniowym regulatorem statycznym. W zadaniu został przedstawiony zamknięty układ regulacji z liniowym obiektem oraz regulatorem 2-położeniowym bez histerezy i z histerezą. W ramach zadania należy sprawdzić, dla jakiej wartości amplitudy przekaźnika ym oraz histerezy równej h = 0.0, h = 0.05, h = 0.1, amplituda cyklu granicznego będzie większa od 1, 2, 5. W ramach opracowania wyników należy przedstawić rysunek z przebiegiem wielkości regulowanej w układzie oraz narysować wykres Nyquista części liniowej wraz z wykresem krytycznym. Porównanie wyników analitycznych z otrzymanymi podczas laboratorium będzie dodatkową analizą.

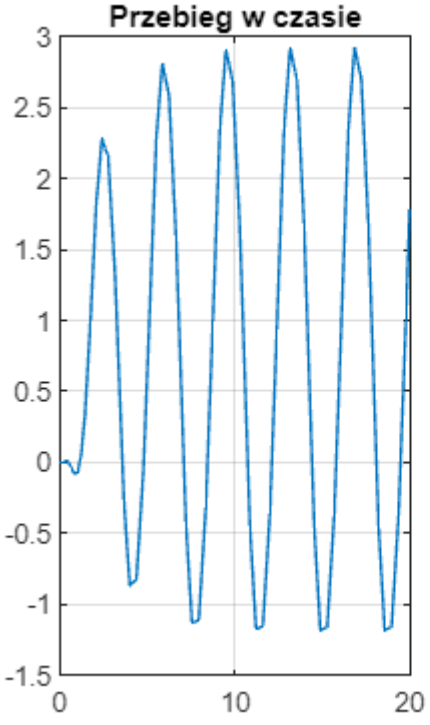
```
G = [1, 3, 3, 1];
h_vec = [0, 0.05, 0.1];
y_mat = [[  7.3, 13, 33];
         [  6, 12, 32];
         [  5, 12, 31]];
y = 10;
for i = 1:3
    for j = 1:3
        h = h_vec(i);
        y = y_mat(i, j);
        test(G, h, y);
    end
end
```

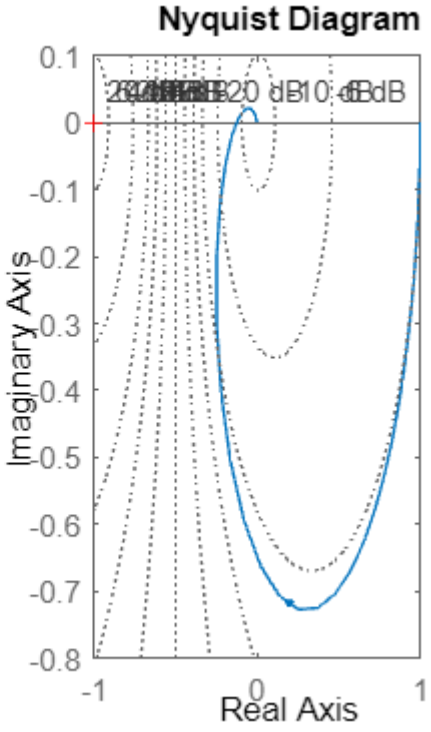
```
h = 0
y = 7.3000
```


Przebieg w czasie
2.5
2
1.5
1
0.5
0
-0.5
0
10
20

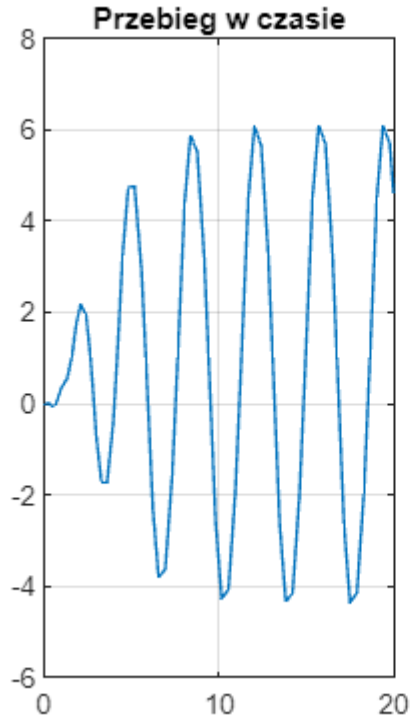

Nyquist Diagram
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
Imaginary Axis
-1
0
1
Real Axis

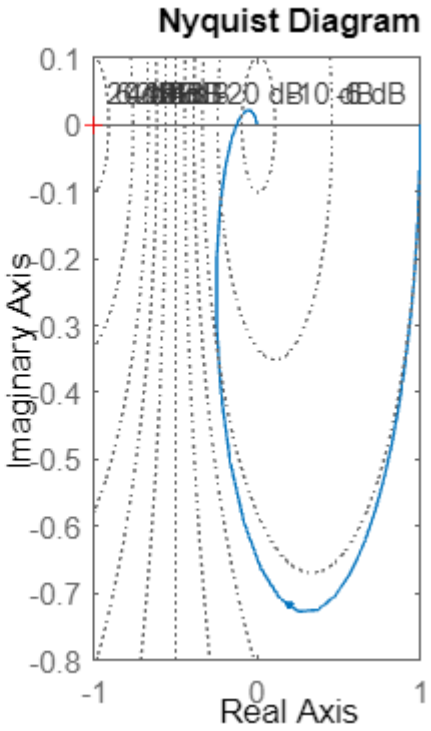
```
h = 0
y = 13
```


Przebieg w czasie
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
0
10
20

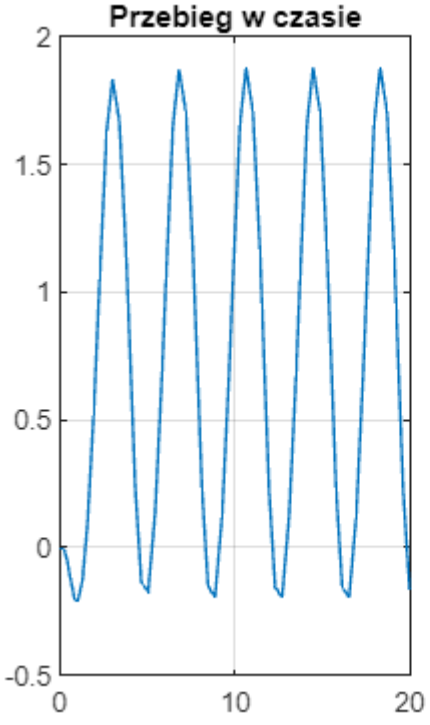

Nyquist Diagram
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
Imaginary Axis
-1
0
1
Real Axis

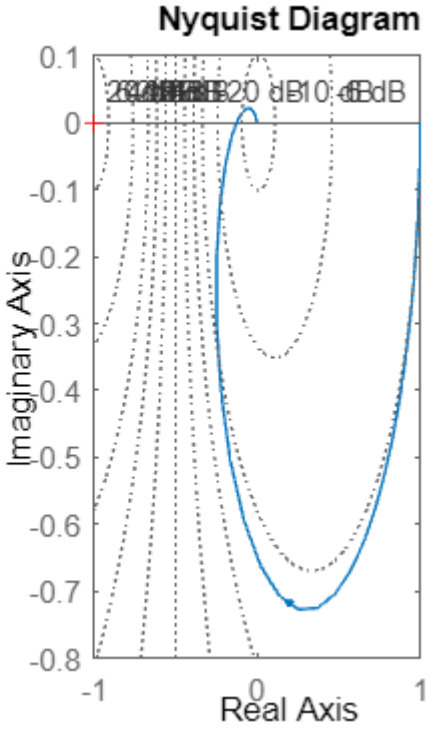
```
h = 0
y = 33
```



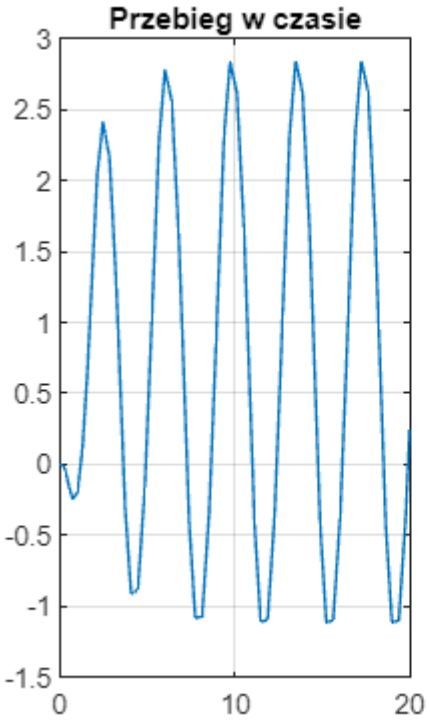


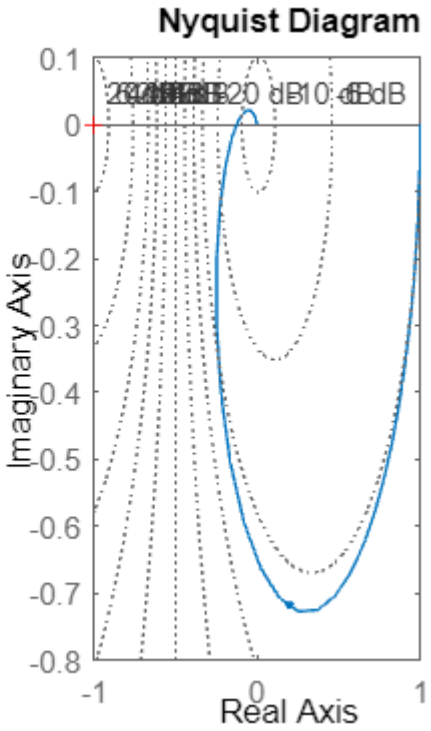

```
h = 0.0500
y = 6
```



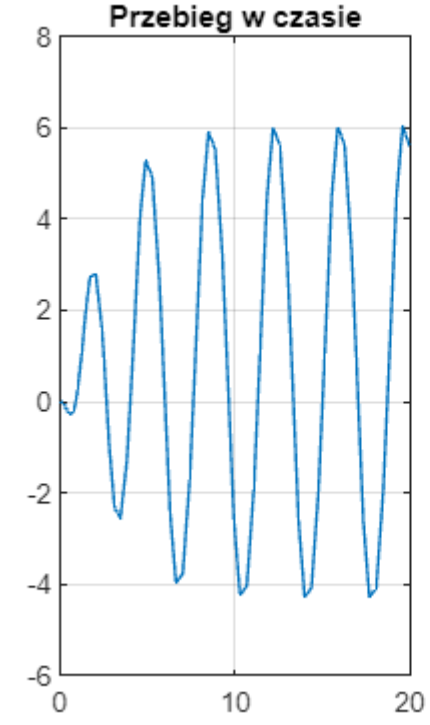


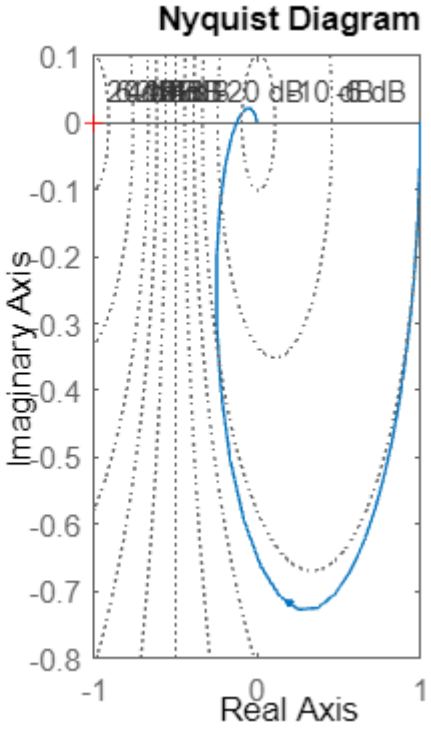

```
h = 0.0500
y = 12
```



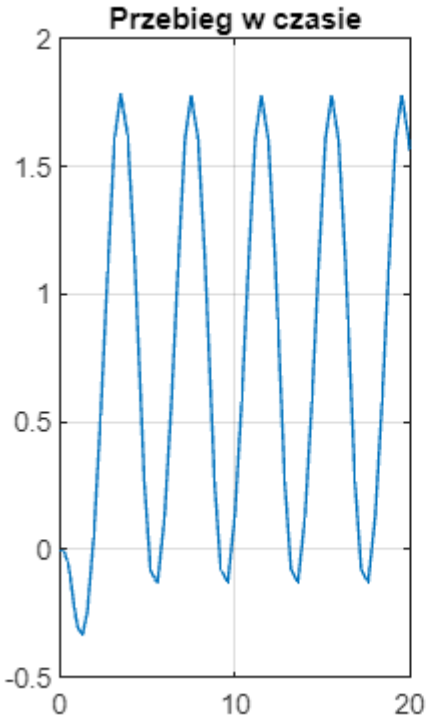


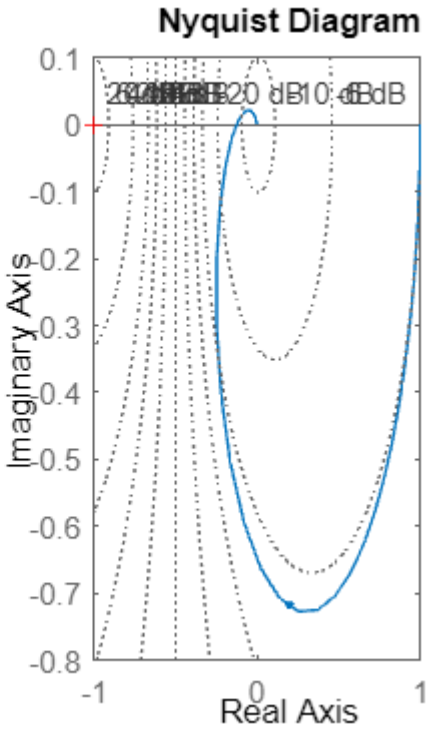

```
h = 0.0500
y = 32
```



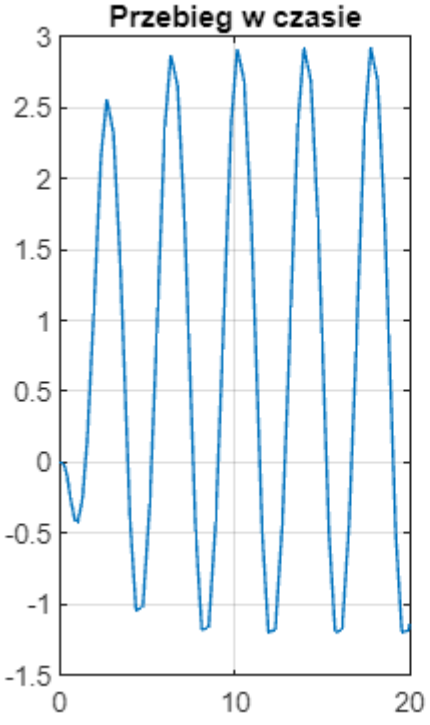


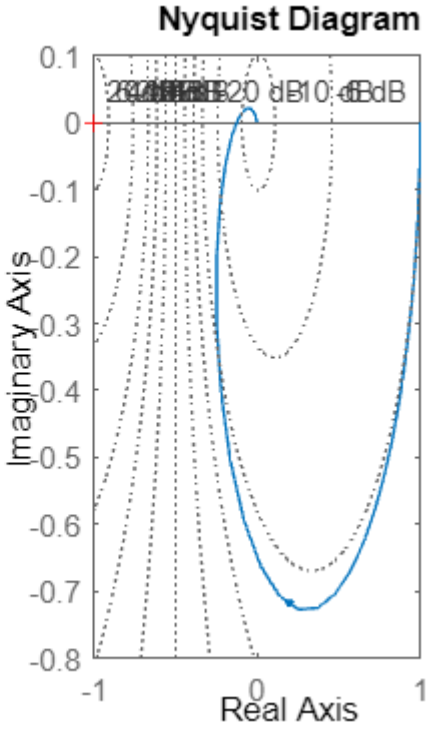

```
h = 0.1000
y = 5
```



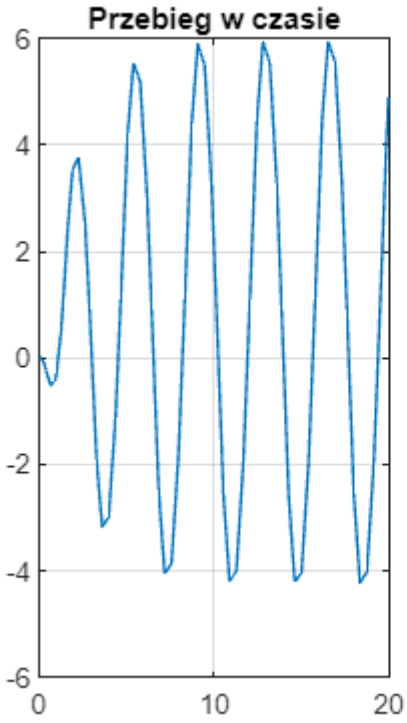


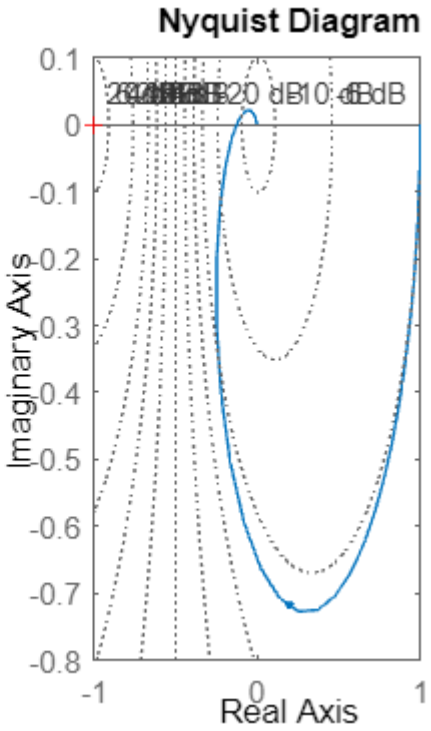

```
h = 0.1000
y = 12
```



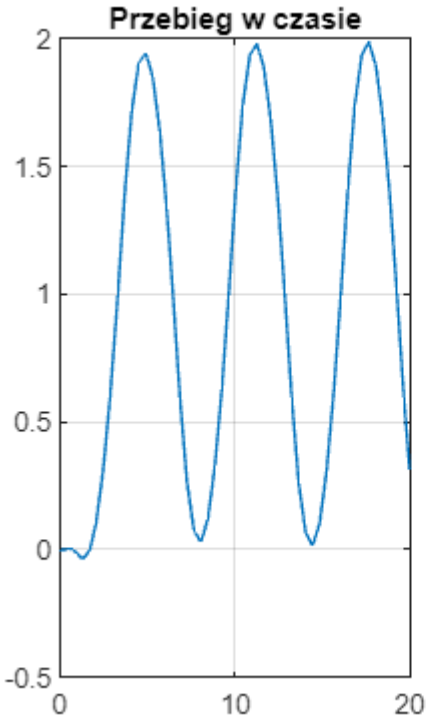


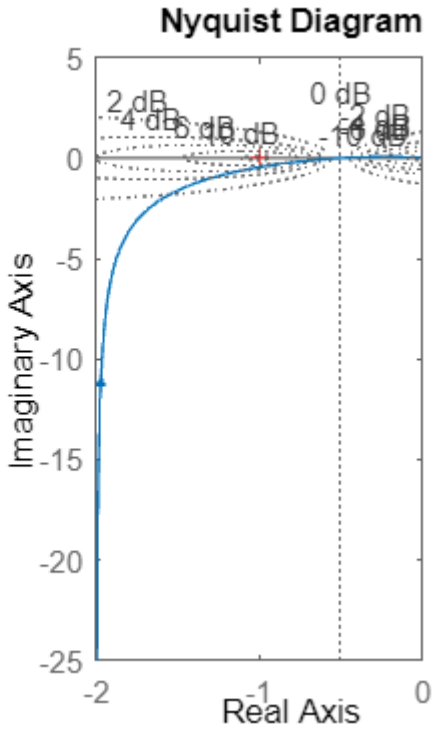

```
h = 0.1000
y = 31
```

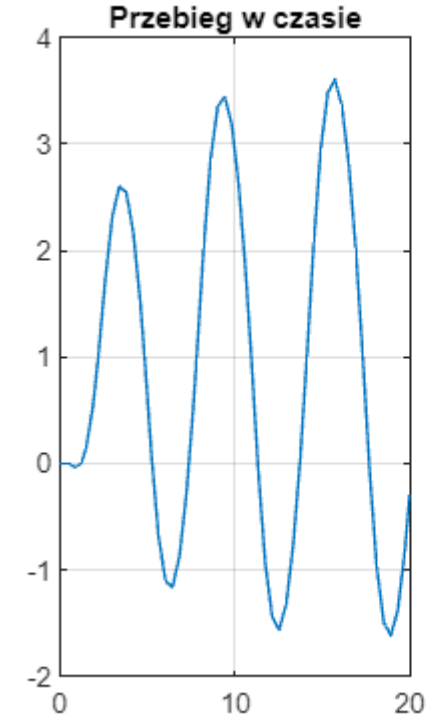


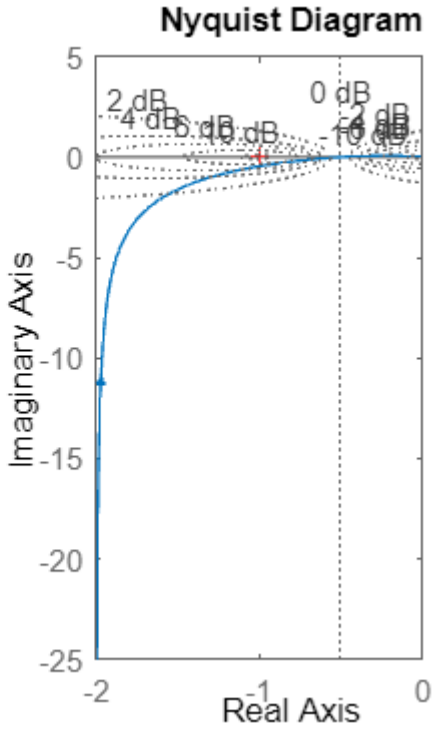


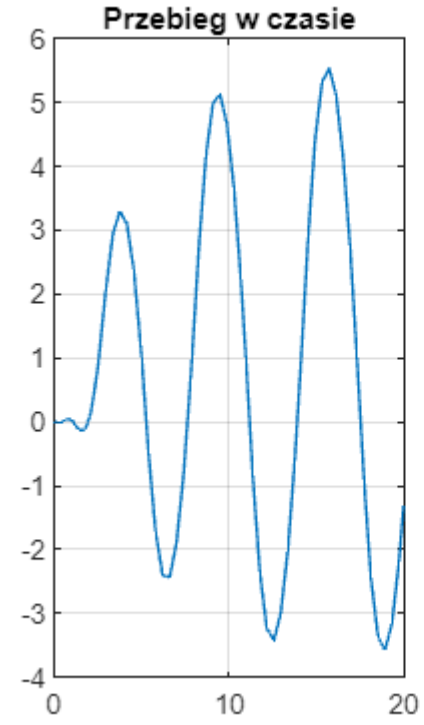

```
G = [1, 2, 1, 0];
y_mat = [[  1.5, 4, 7];
         [  1.5, 3.5, 8];
         [  1.5, 3.1, 7.3]];
y = 10;
for i = 1:3
    for j = 1:3
        h = h_vec(i);
        y = y_mat(i, j);
        test(G, h, y);
    end
end
```

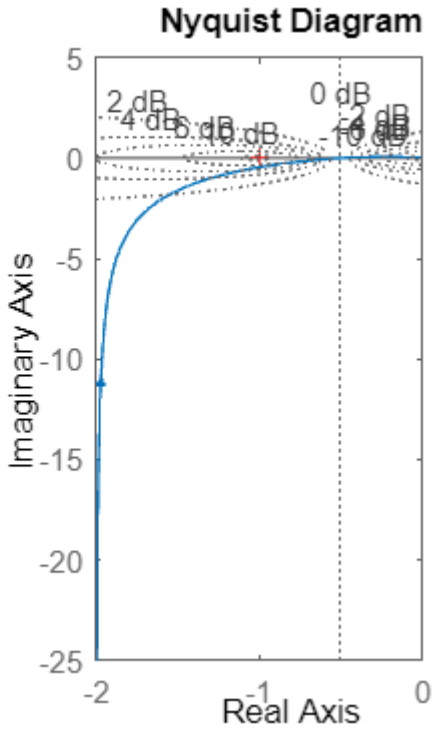

Przebieg w czasie
2
1.5
1
0.5
0
-0.5
0
10
20

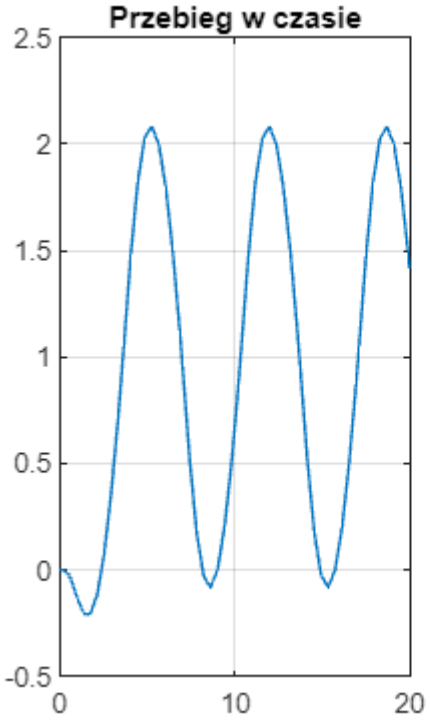

Nyquist Diagram
2 dB
4 dB
6 dB
0 dB
5
0
-5
-10
-15
-20
-25
-2
-1
0
Imaginary Axis
Real Axis

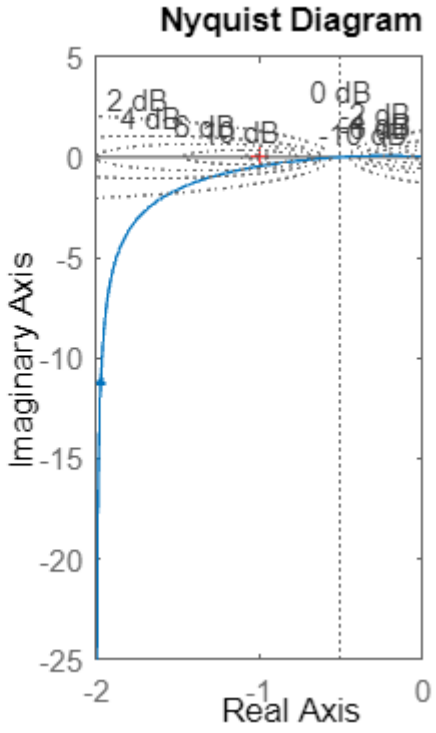

Przebieg w czasie
4
3
2
1
0
-1
-2
0
10
20

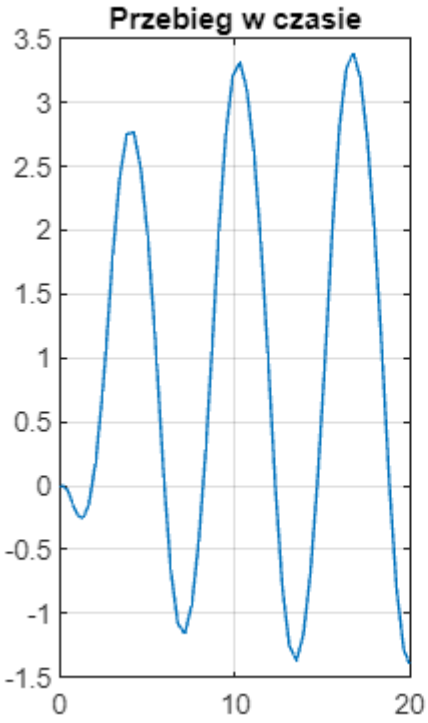

Nyquist Diagram
2 dB
4 dB
6 dB
0 dB
5
0
-5
-10
-15
-20
-25
-2
-1
0
Imaginary Axis
Real Axis

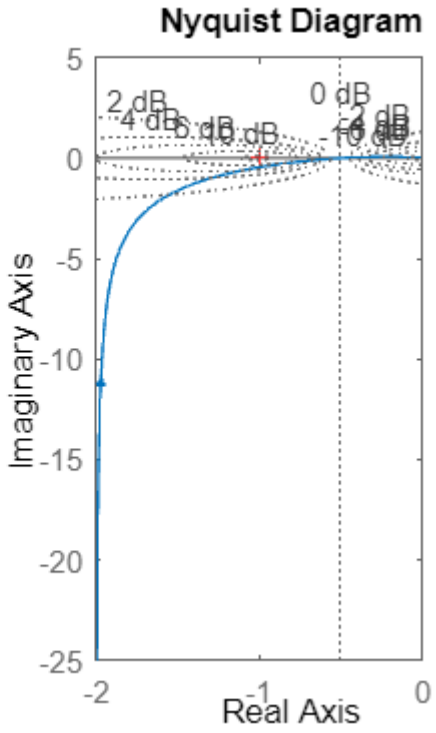

Przebieg w czasie
6
5
4
3
2
1
0
-1
-2
-3
-4
0
10
20

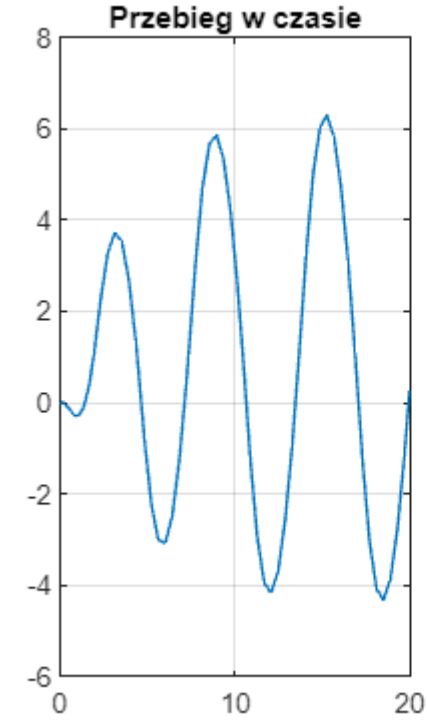

Nyquist Diagram
2 dB
4 dB
6 dB
0 dB
5
0
-5
-10
-15
-20
-25
-2
-1
0
Imaginary Axis
Real Axis

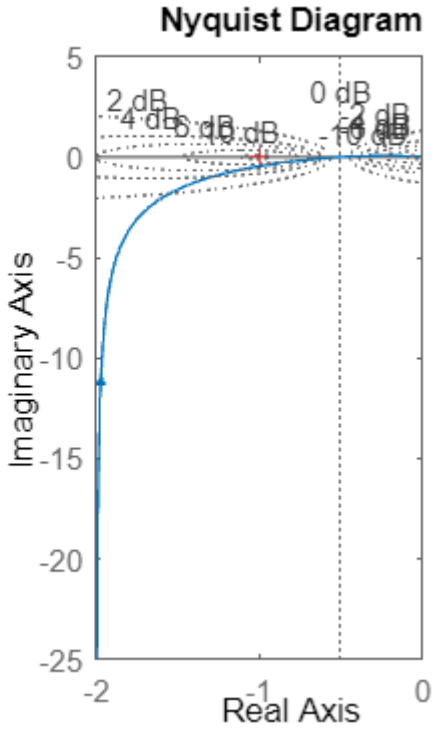

Przebieg w czasie
2.5
2
1.5
1
0.5
0
-0.5
0
10
20

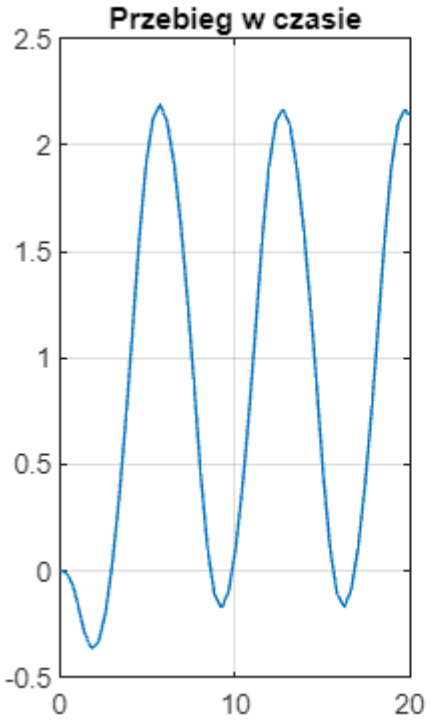

Nyquist Diagram
2 dB
4 dB
6 dB
0 dB
5
0
-5
-10
-15
-20
-25
-2
-1
0
Imaginary Axis
Real Axis

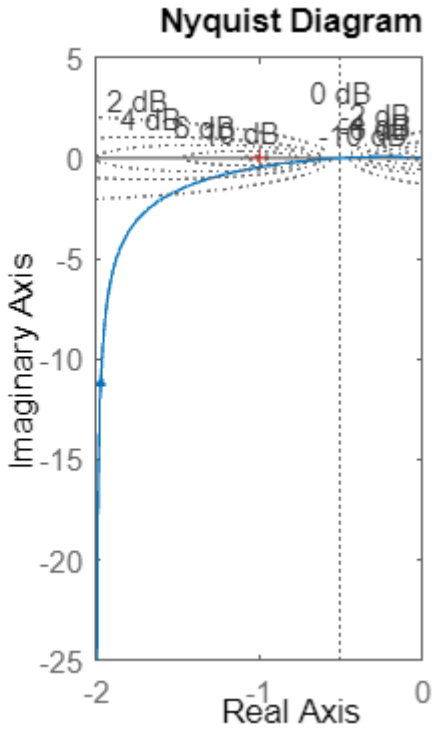

Przebieg w czasie
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
0
10
20

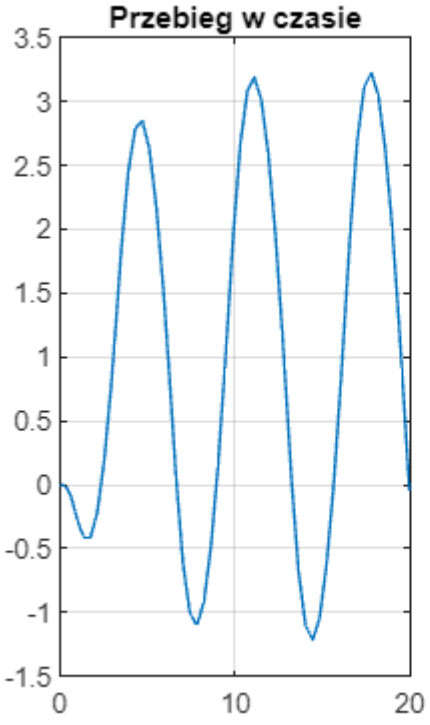

Nyquist Diagram
2 dB
4 dB
6 dB
0 dB
5
0
-5
-10
-15
-20
-25
-2
-1
0
Imaginary Axis
Real Axis

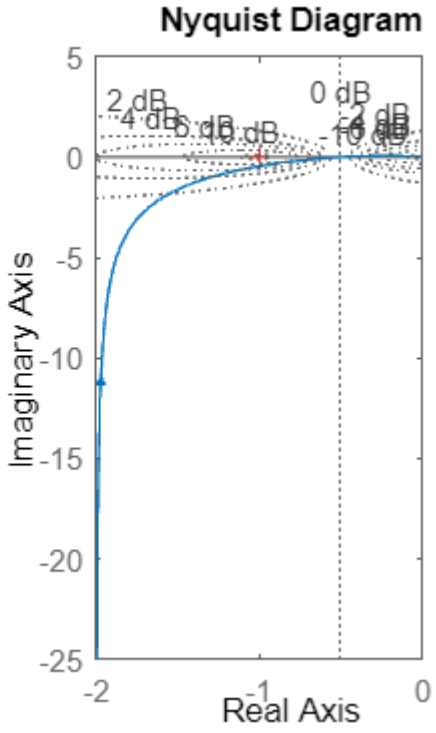

Przebieg w czasie
8
6
4
2
0
-2
-4
-6
0
10
20

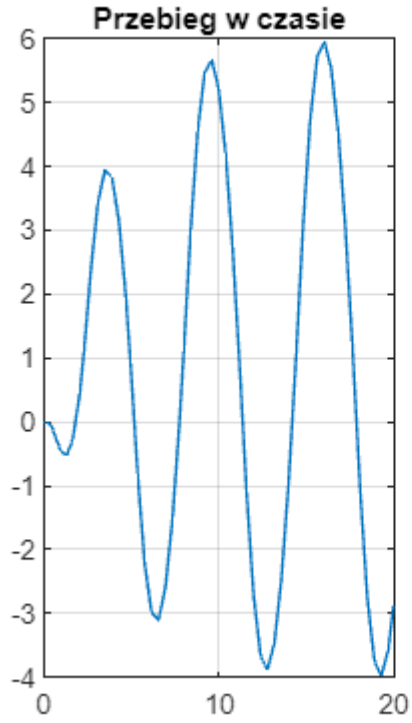

Nyquist Diagram
2 dB
4 dB
6 dB
0 dB
5
0
-5
-10
-15
-20
-25
-2
-1
0
Imaginary Axis
Real Axis

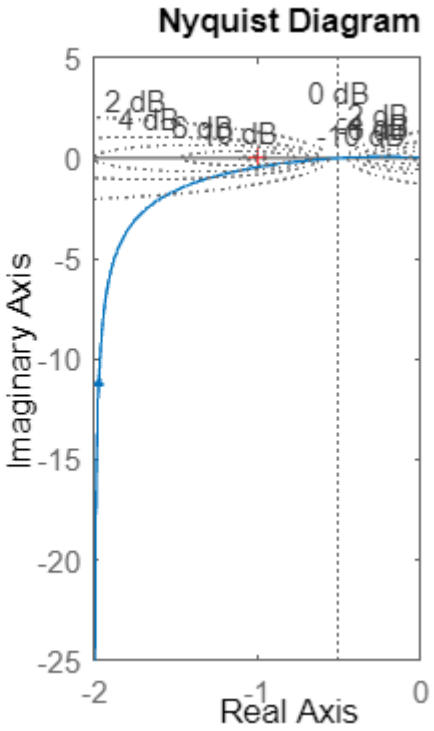

Przebieg w czasie
2.5
2
1.5
1
0.5
0
-0.5
0
10
20


Nyquist Diagram
2 dB
4 dB
6 dB
0 dB
5
0
-5
-10
-15
-20
-25
-2
-1
0
Imaginary Axis
Real Axis


Przebieg w czasie
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
0
10
20

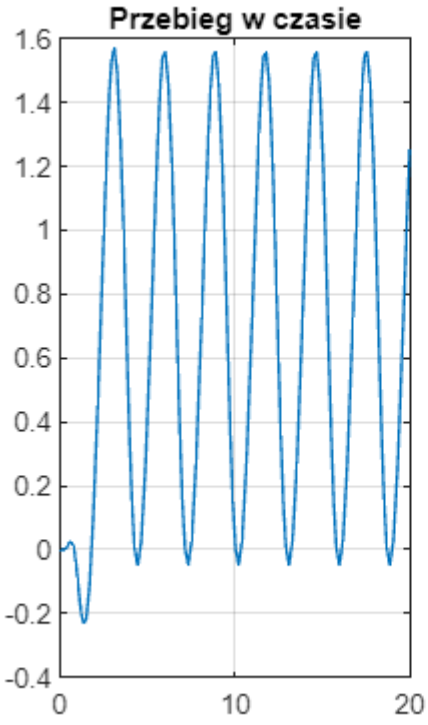

Nyquist Diagram
2 dB
4 dB
6 dB
0 dB
5
0
-5
-10
-15
-20
-25
-2
-1
0
Imaginary Axis
Real Axis

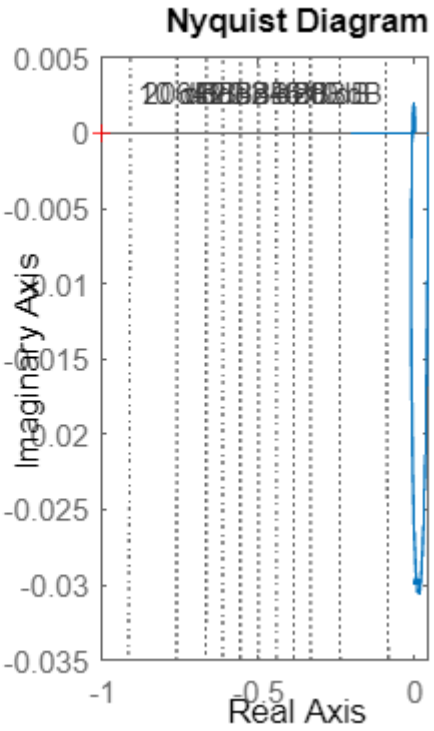




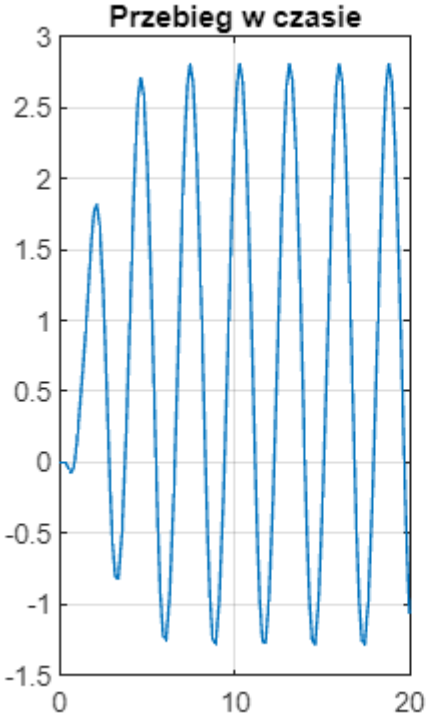

```
G = [1, 10, 35, 50, 24];
y_mat = [[  80, 200, 500];
         [  100, 250, 420];
         [  110, 222, 450]];
y = 10;
for i = 1:3
    for j = 1:3
        h = h_vec(i);
        y = y_mat(i, j);
        test(G, h, y);
    end
end
```

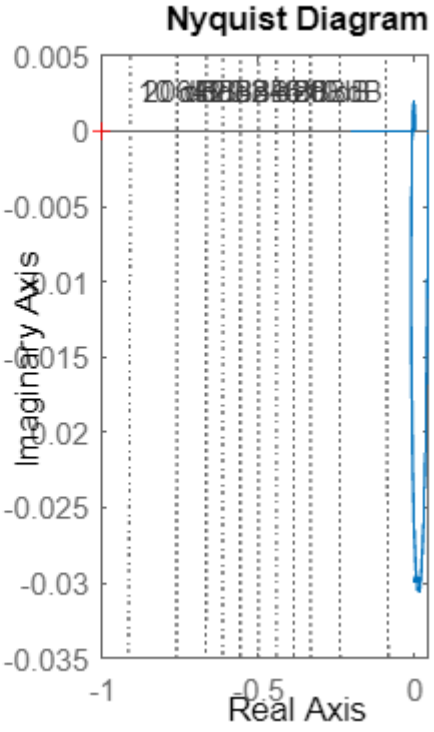
```
h = 0
y = 80
```



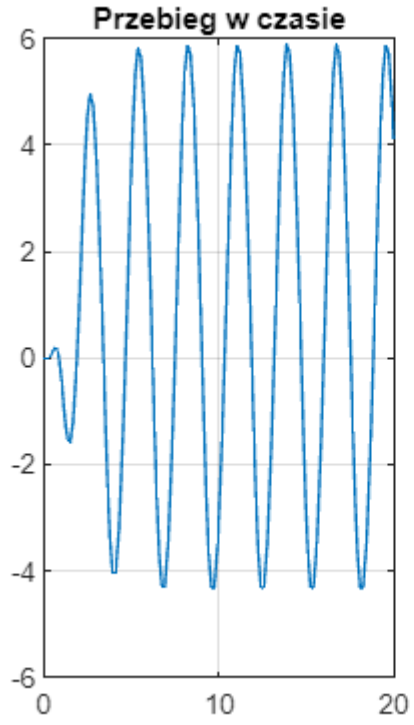


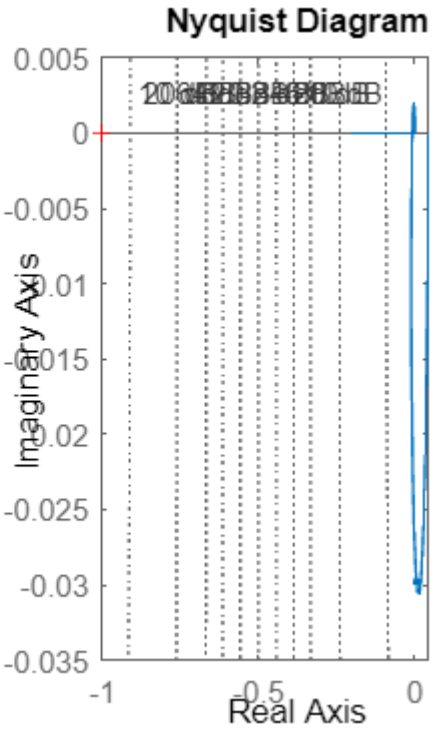

```
h = 0
y = 200
```



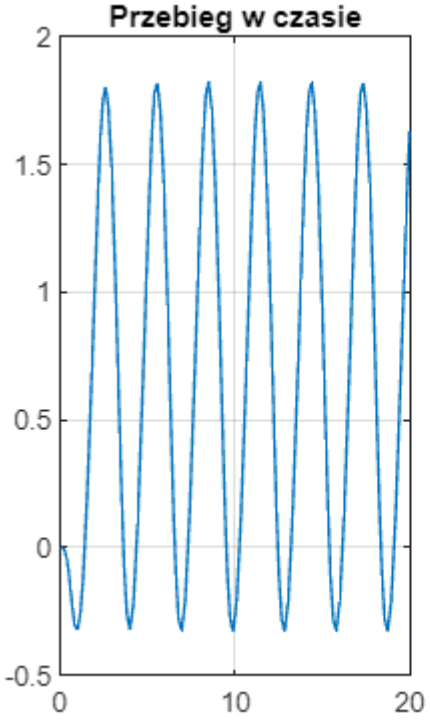


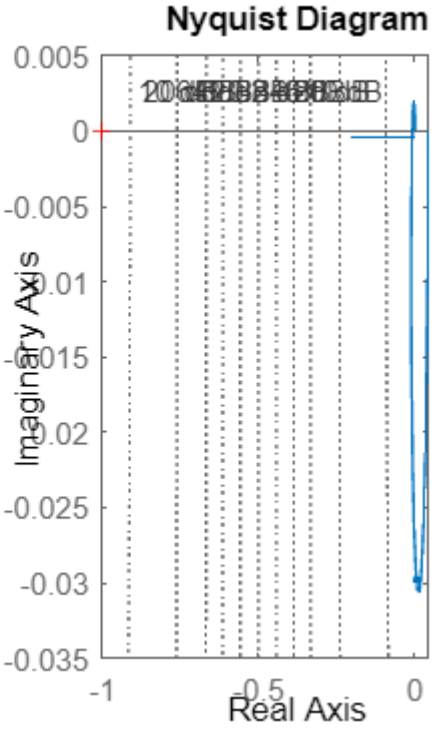

```
h = 0
y = 500
```



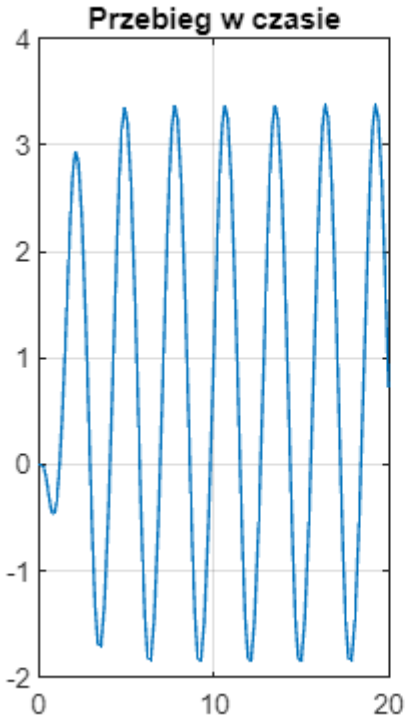


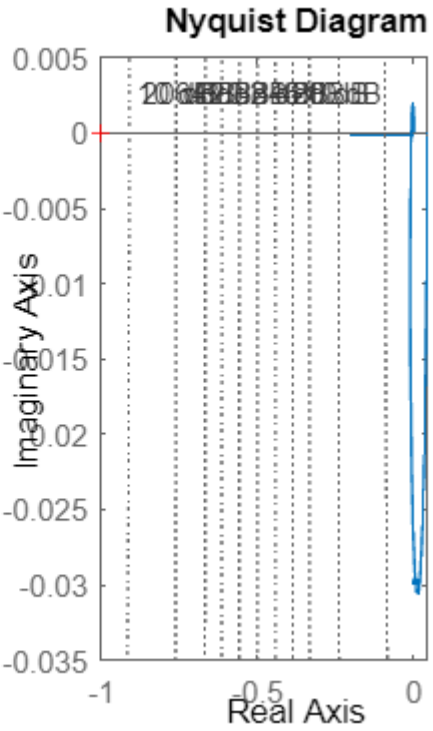

```
h = 0.0500
y = 100
```



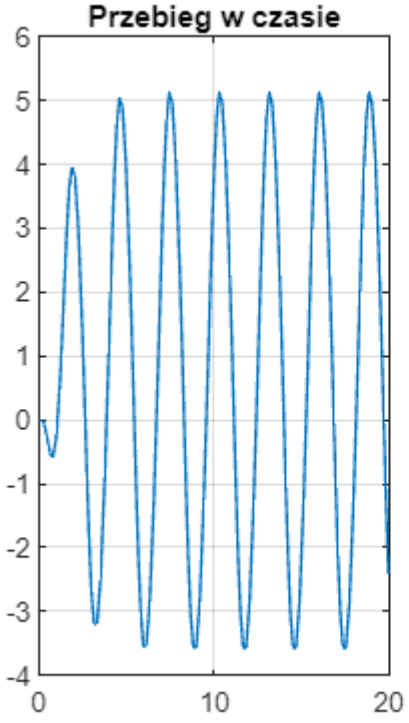


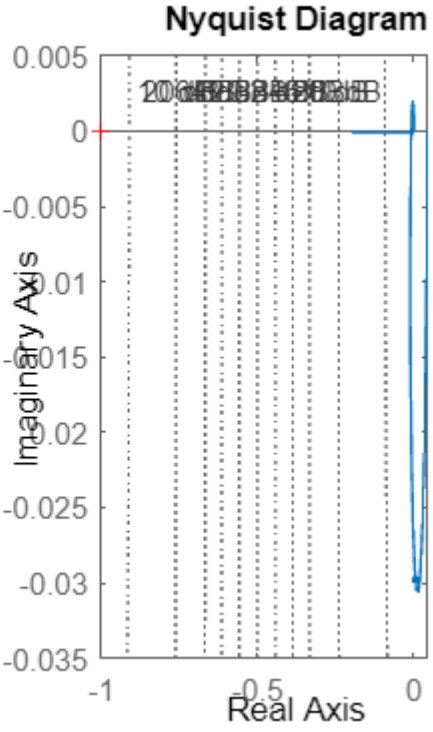

```
h = 0.0500
y = 250
```



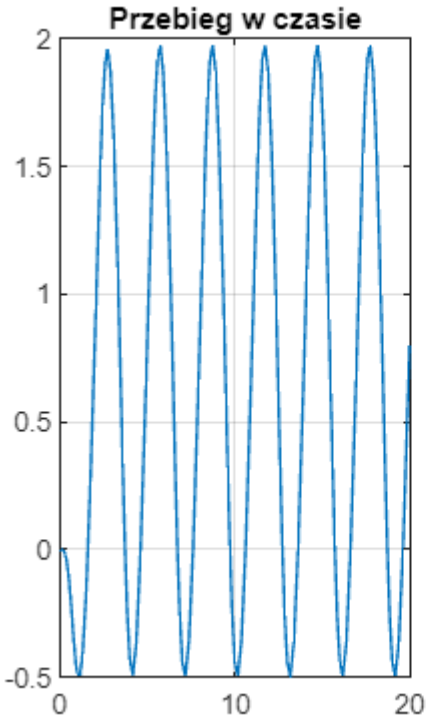


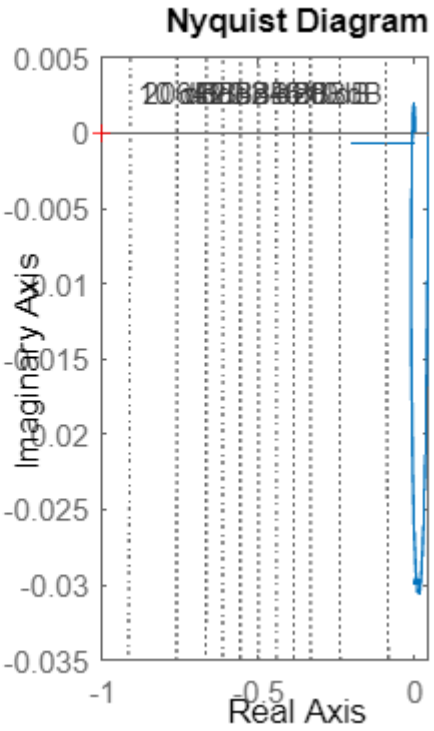

```
h = 0.0500
y = 420
```



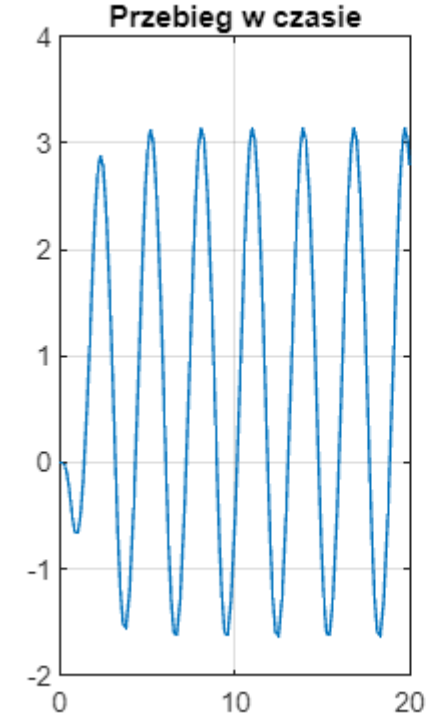


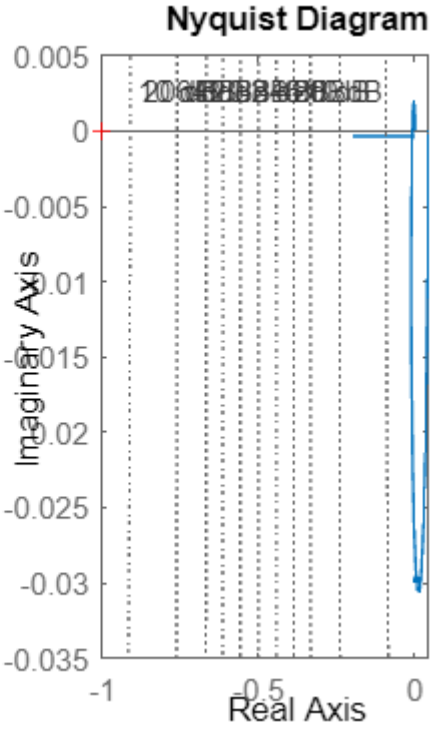

```
h = 0.1000
y = 110
```



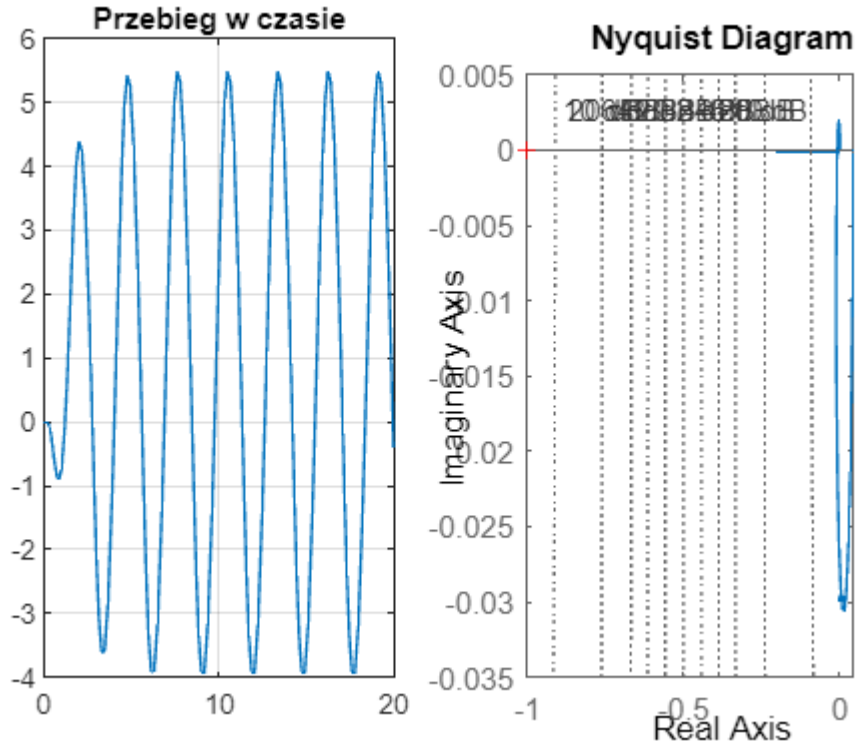



```
h = 0.1000
y = 222
```






```
h = 0.1000
y = 450
```




```
function [] = test(G, h, ym)
    obiekt = tf([0,0,0,1], G);
    c = (-pi*h)/(4 * ym);
    out = sim("obiekt_reg.slx");
    figure;
    subplot(1, 2, 1);
    plot(out.ScopeData.time, out.ScopeData.signals.values);
    title("Przebieg w czasie");
    grid on;
    subplot(1, 2, 2);
    n = nyquistplot(obiekt);
    opt = getoptions(n);
    opt.ShowFullContour = 'off';
    setoptions(n, opt);
    hold on;
    plot([-0.2, 0], [c, c]);
    grid on;
    hold off;
end
```