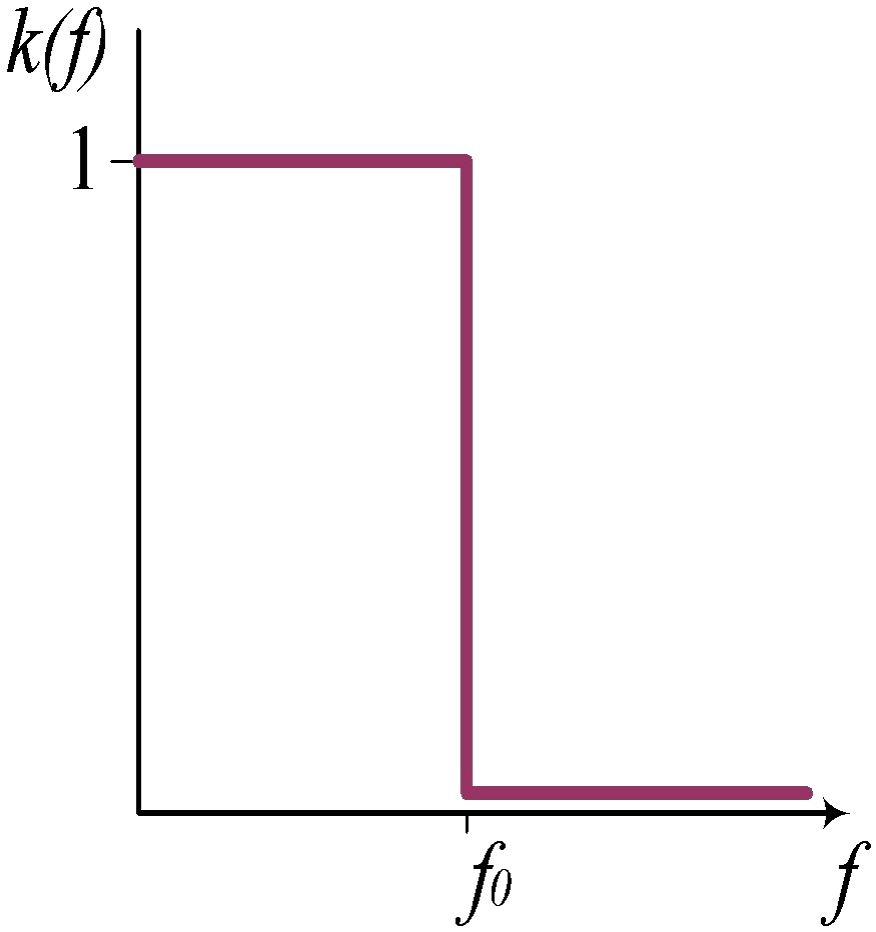
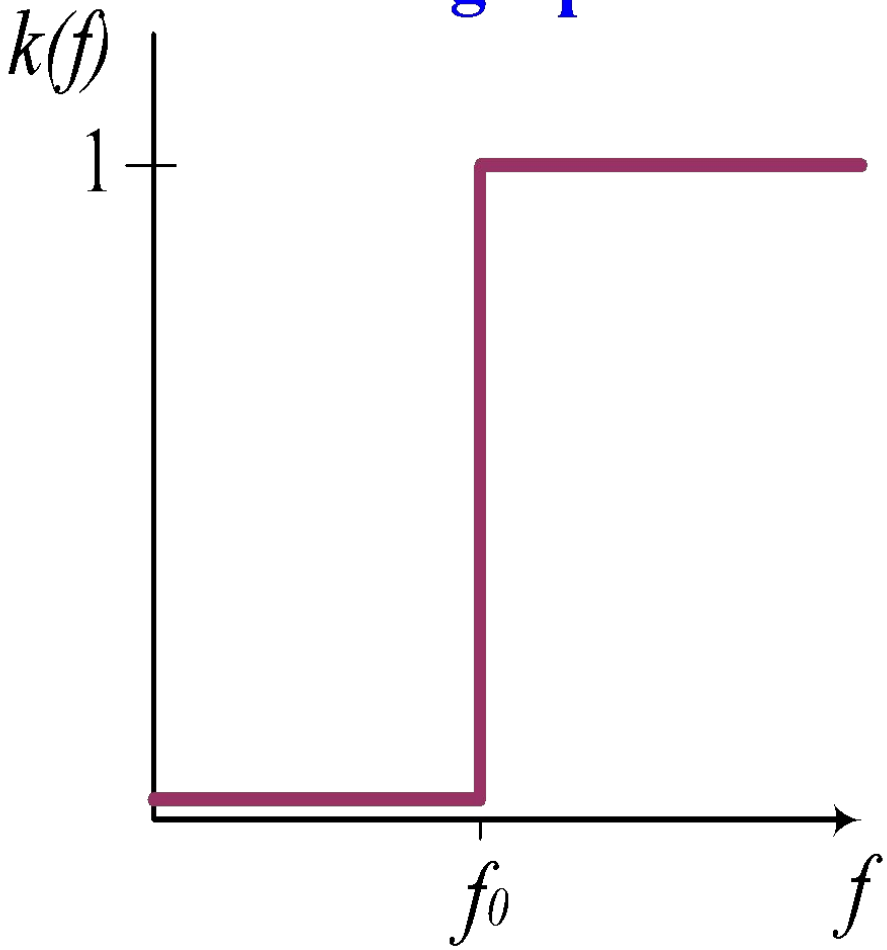
Цифровые фильтры

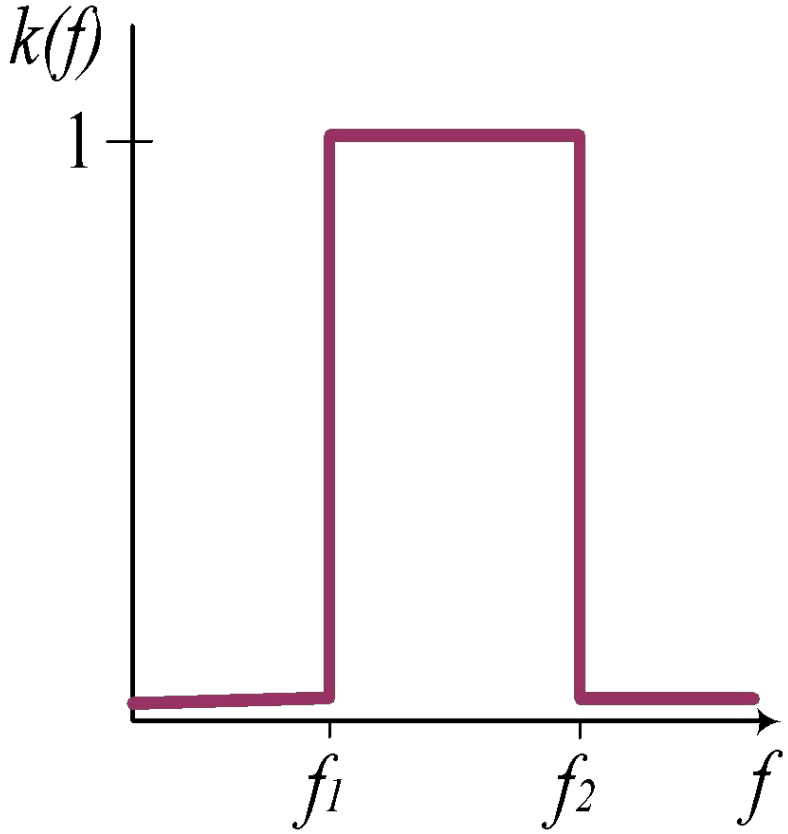
ФНЧ - low-pass filter



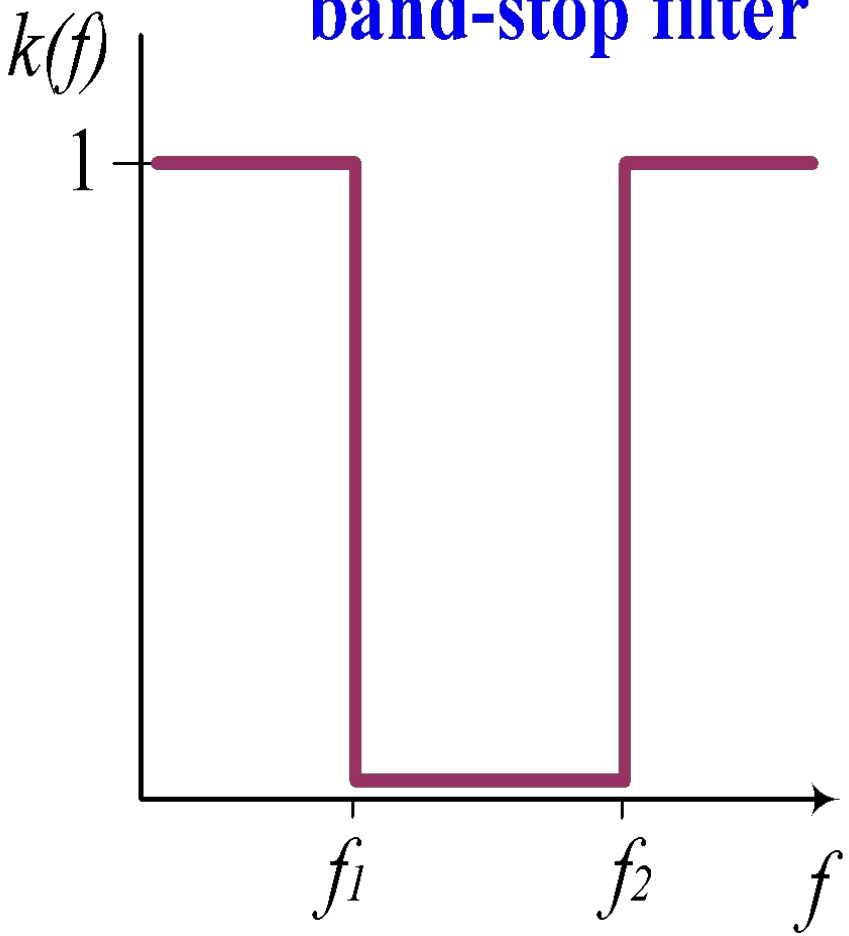
ФВЧ - high-pass filter

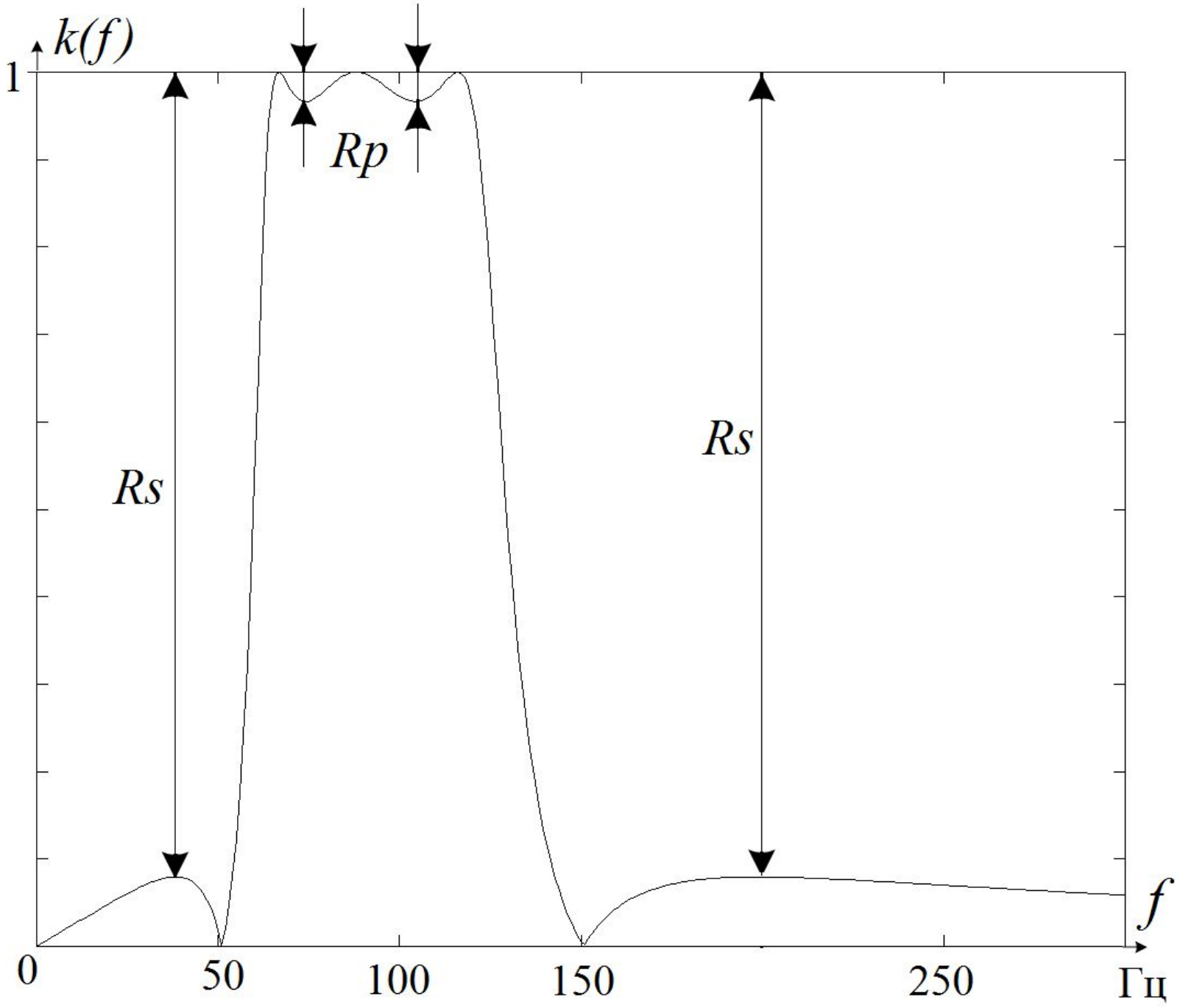


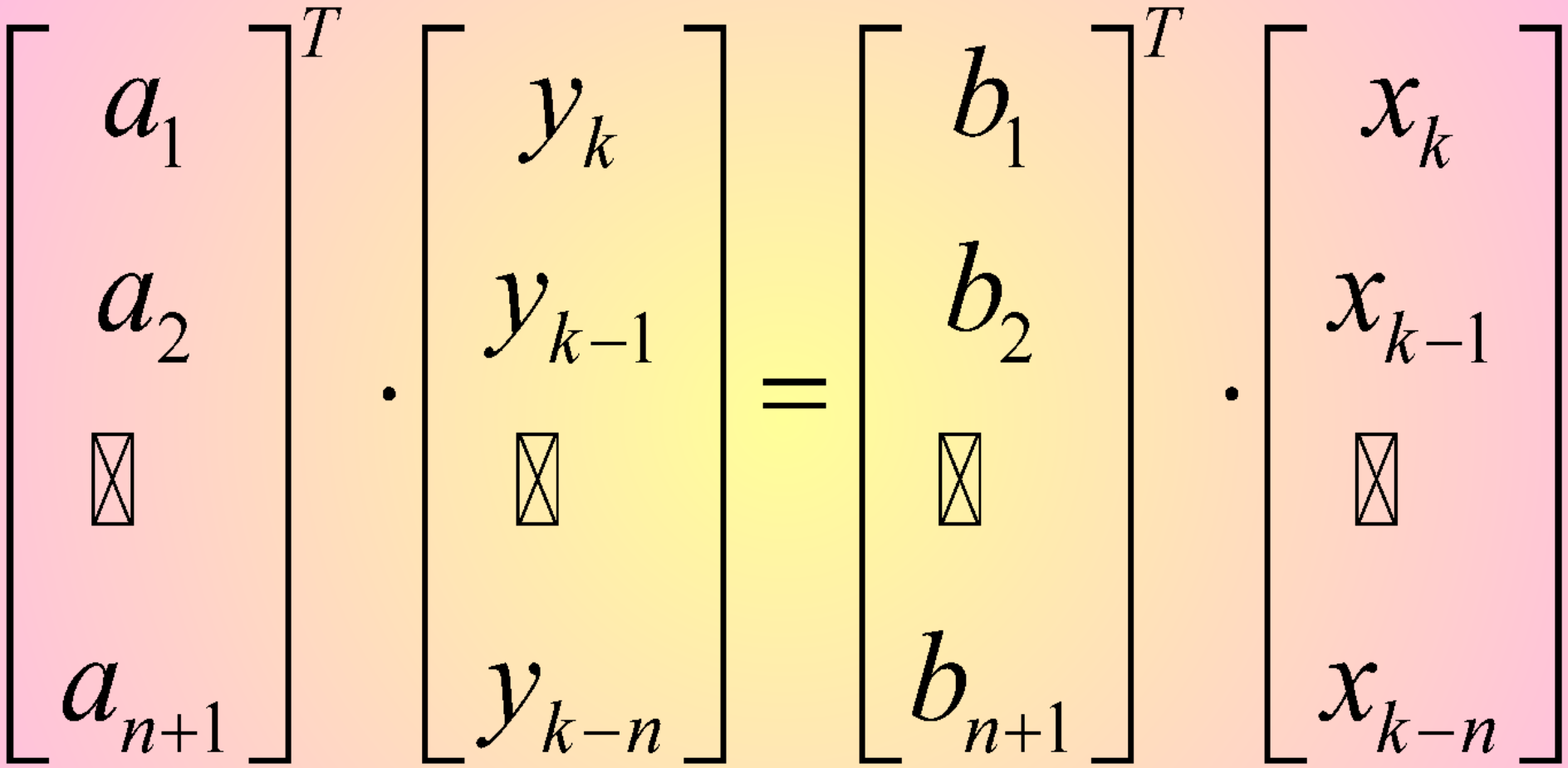
полосовой - band-pass filter



режекторный - band-stop filter

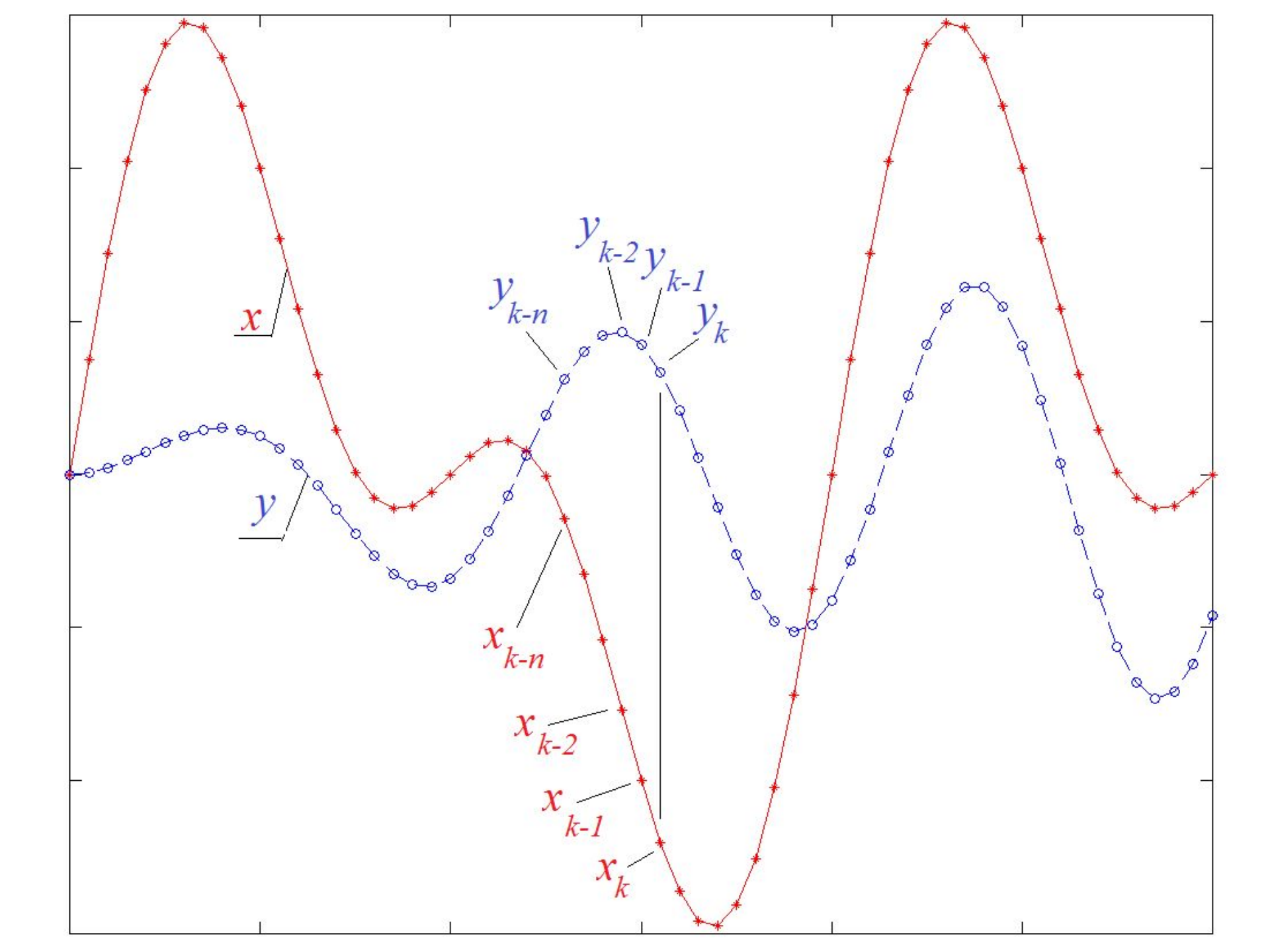


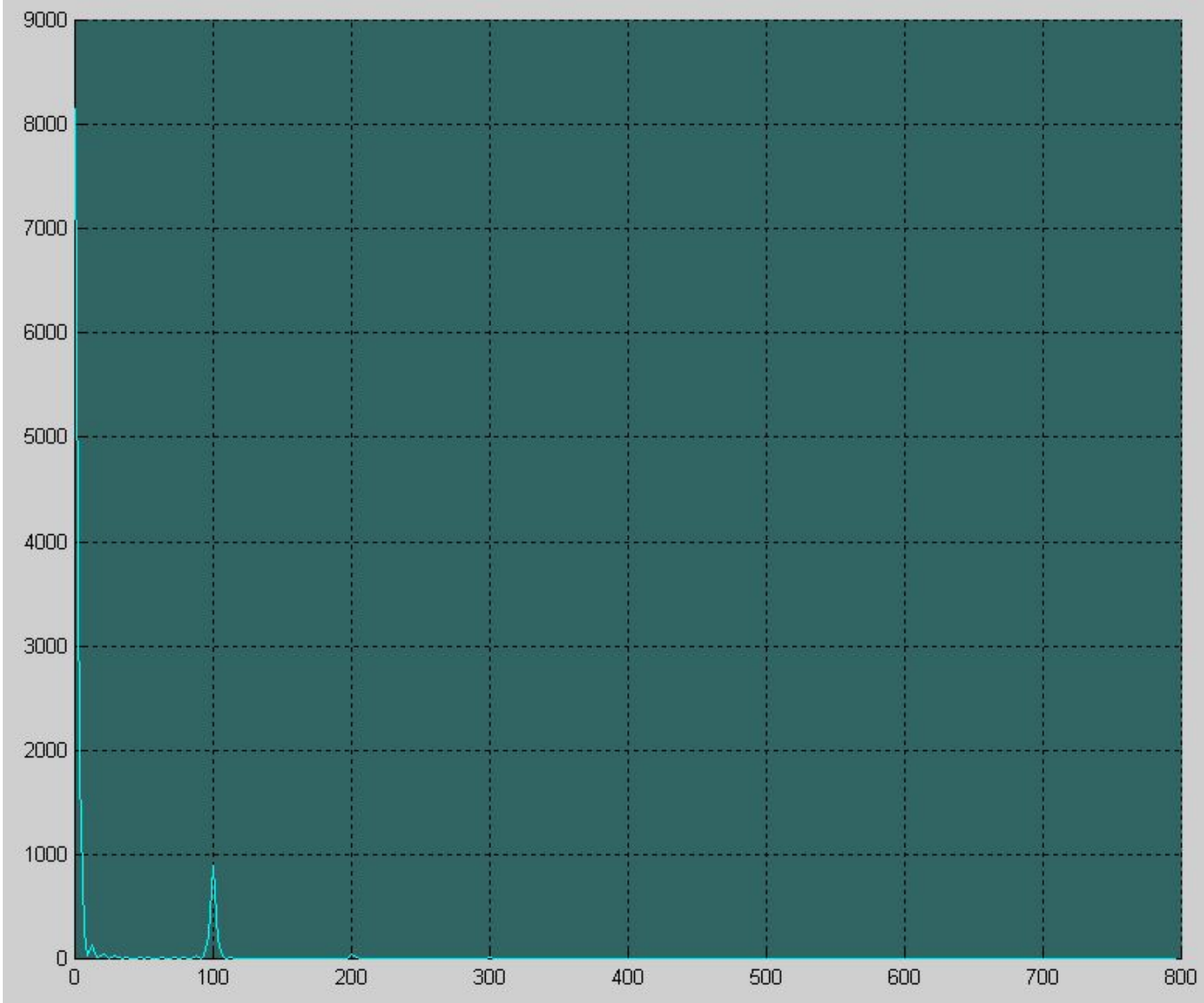

k(f)
1
Rp
Rs
Rs
f
0
50
100
150
250
Гц

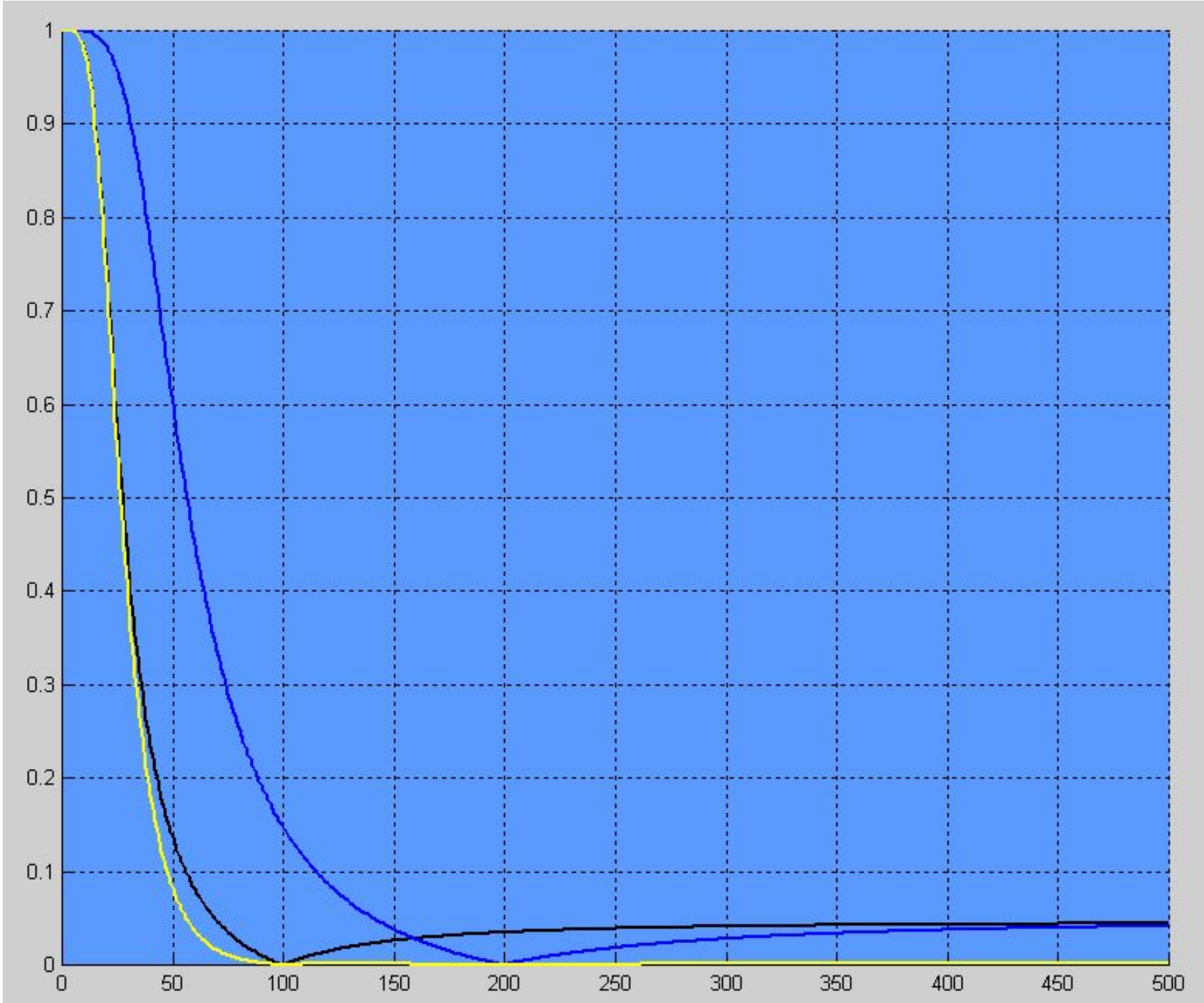

$\begin{bmatrix} a_1 \\ a_2 \\ \vdots \\ a_{n+1} \end{bmatrix}^T \cdot \begin{bmatrix} y_k \\ y_{k-1} \\ \vdots \\ y_{k-n} \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ \vdots \\ b_{n+1} \end{bmatrix}^T \cdot \begin{bmatrix} x_k \\ x_{k-1} \\ \vdots \\ x_{k-n} \end{bmatrix}$

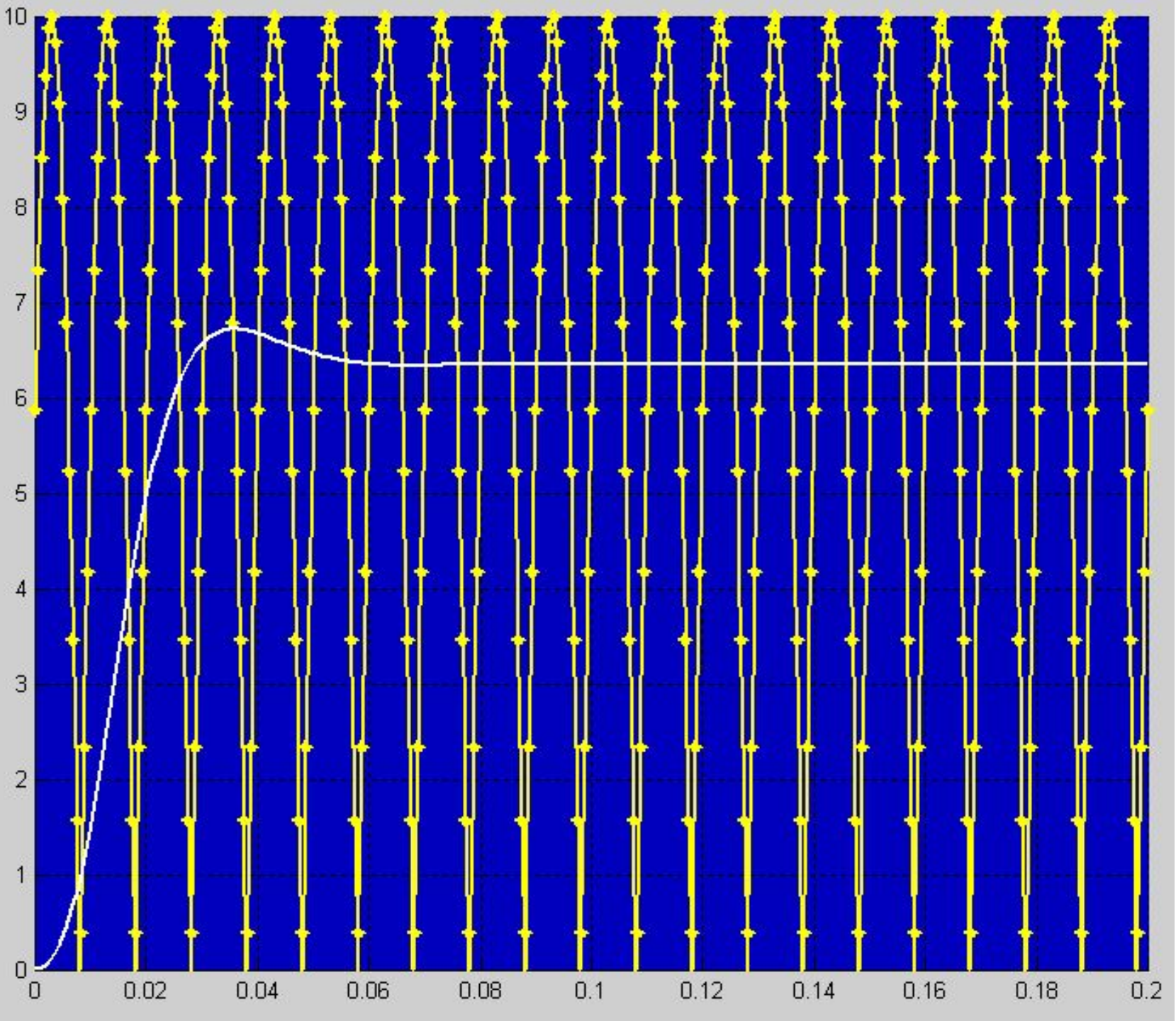
$$a_1 \cdot y_k = b_1 \cdot x_k + b_2 \cdot x_{k-1} + b_3 \cdot x_{k-2} + \ldots + b_{n+1} \cdot x_{k-n} -$$

$$- a_2 \cdot y_{k-1} - a_3 \cdot y_{k-2} - \ldots - a_{n+1} \cdot y_{k-n}$$


x
y
y_{k-n}
y_{k-2}
y_{k-1}
y_k
x_{k-n}
x_{k-2}
x_{k-1}
x_k


9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
100
200
300
400
500
600
700
800


1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
50
100
150
200
250
300
350
400
450
500


10
9
8
7
6
5
4
3
2
1
0
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2

Выделение постоянной составляющей (замер среднего значения)

```
fs = 1600;%частота дискретизации
[b1, a1] = ellip ( 2, 0.001, 27, 7.45/fs);
          %для заграждения 100Гц
[b2, a2] = ellip ( 2, 0.001, 27, 15.5/fs);
          %для заграждения 200Гц
b = conv(b1, b2);% свёртка
a = conv(a1, a2);
```