$$\int_{\omega_j-\Delta\omega}^{\omega_j} \left(1+\frac{\omega-\omega_j}{\Delta\omega}\right) e^{-i\omega t} d\omega = \frac{i}{t} e^{-i\omega_j t} \left(1-\frac{i}{t\Delta\omega}\left(1-e^{i\Delta\omega t}\right)\right) \tag{1}$$

$$\int_{\omega_j}^{\omega_j+\Delta\omega} \left(1-\frac{\omega-\omega_j}{\Delta\omega}\right) e^{-i\omega t} d\omega = \frac{i}{t} e^{-i\omega_j t} \left(-1-\frac{i}{t\Delta\omega}\left(1-e^{-i\Delta\omega t}\right)\right) \tag{2}$$

$$f_c = \frac{\omega_c}{2\pi} \tag{3}$$

$$T = \frac{1}{f_c} = \frac{2\pi}{\omega_c} \tag{4}$$

$$V_1(t) = \sin(2\pi f_c t) \cdot \sin(\pi f_c \frac{t}{2}) = \sin(\omega_c t) \cdot \sin(\omega_c \frac{t}{4}) \tag{5}$$

Для функции f_1 явные формулы:

$$f_1(\omega) = i(e_1 - e_2 - e_3 + e_4), \tag{6}$$

$$e_i = \frac{e^{\frac{i\pi}{\omega_c}\omega_i} - 1}{\omega_i} \tag{7}$$

$$\omega_1 = 5\omega_c + 4\omega, \omega_2 = 3\omega_c + 4\omega, \omega_3 = -3\omega_c + 4\omega, \omega_4 = -5\omega_c + 4\omega \tag{8}$$

Аналогично

$$f_2(\omega) = s\left(\frac{2\pi N}{\omega_c}\right) - s(0) \tag{9}$$

$$s(t) = \frac{1}{8}\left(e_1 + e_2 - e_3 - e_4 - 2(e_5 - e_6)\right) \tag{10}$$

$$e_i = \frac{e^{it\omega_i}}{\omega_i} \tag{11}$$

$$\omega_1 = \omega_c \frac{N+1}{N} + \omega,$$

$$\omega_2 = \omega_c \frac{N-1}{N} + \omega,$$

$$\omega_3 = \omega_c \frac{1-N}{N} + \omega,$$

$$\omega_4 = -\omega_c \frac{N+1}{N} + \omega,$$

$$\omega_5 = \omega_c + \omega,$$

$$\omega_6 = -\omega_c + \omega \tag{12}$$