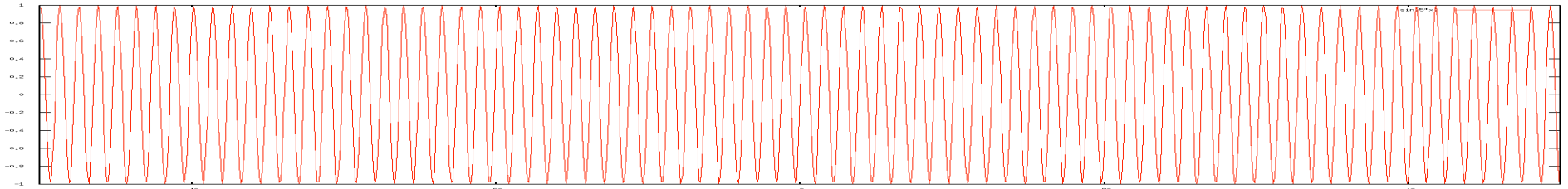


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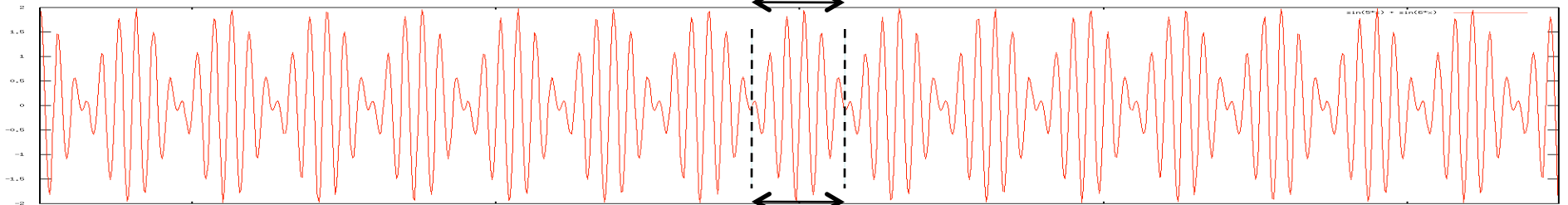
N=1:

N sine waves added with k's between 5.0 and 6.0



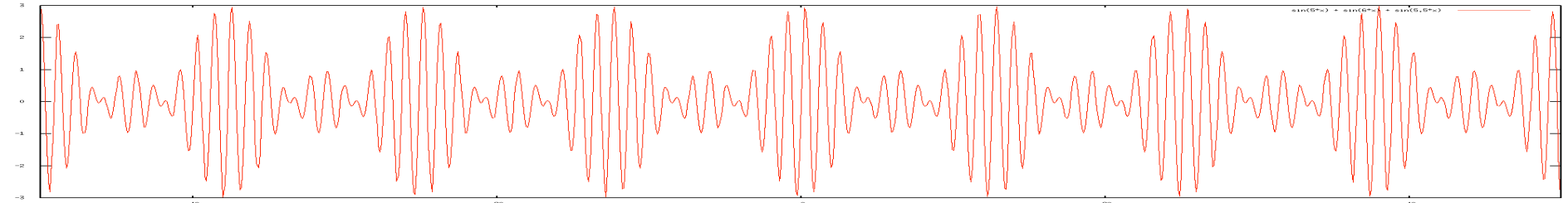
N=2:

$$\Delta x = \pi / \Delta k = \pi / 0.5$$

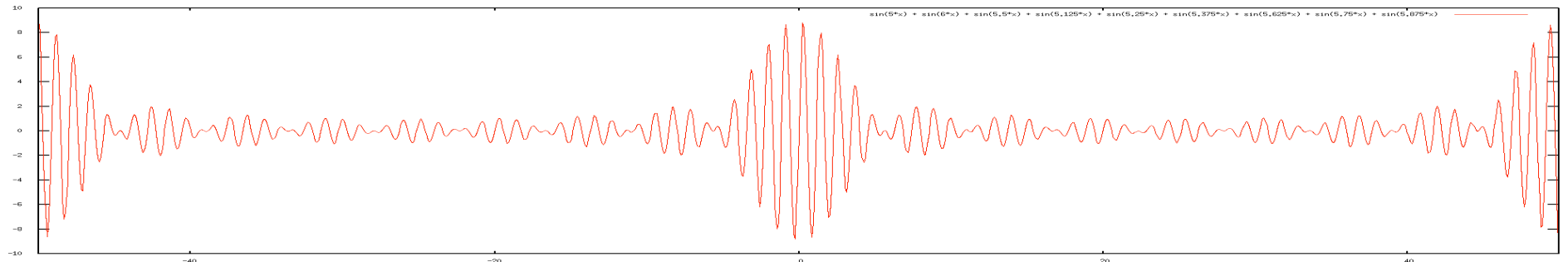


N=3:

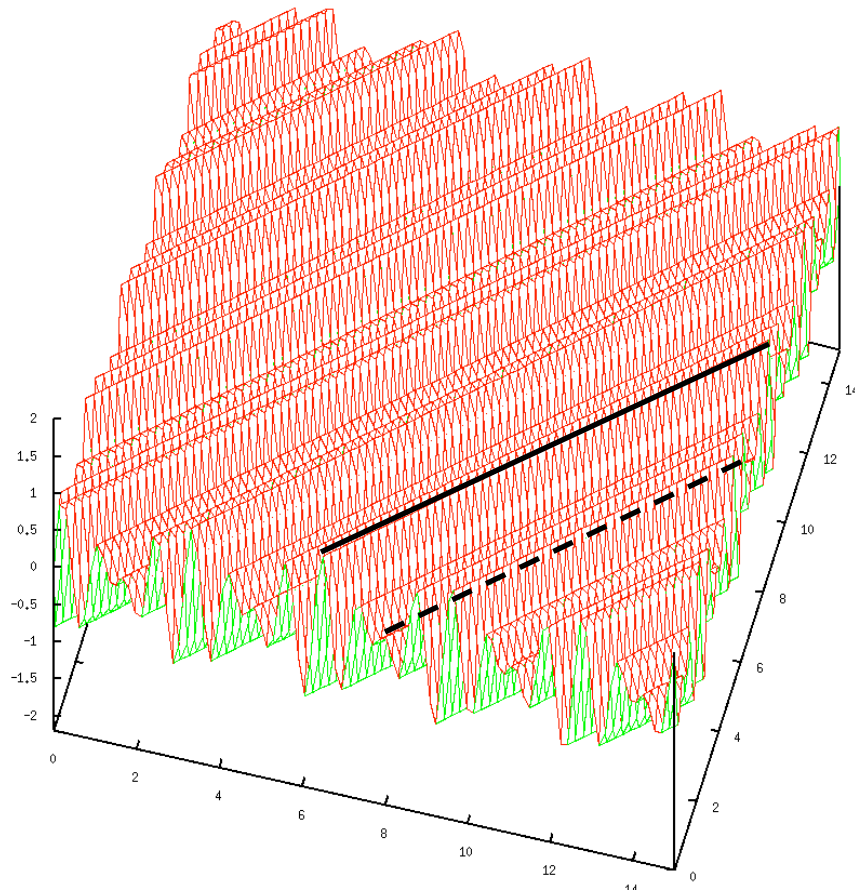
$$\Delta x = 2\pi$$



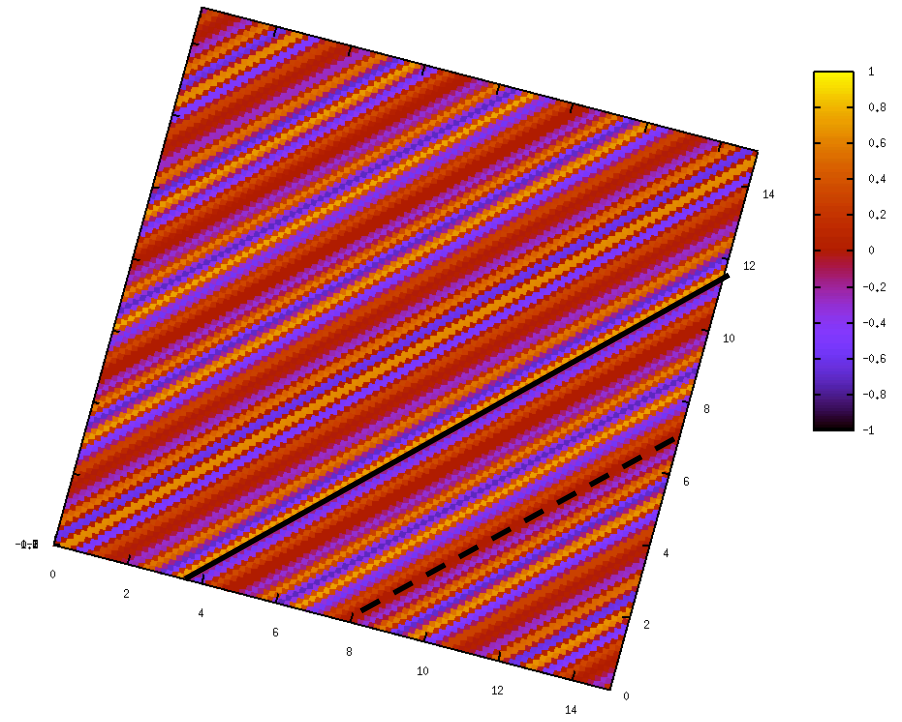
N=9:



$$k_1=6, k_2=8, \omega_1=6, \omega_2=8, k_0=7, \omega_0=7, \Delta k=1, \Delta \omega=1$$

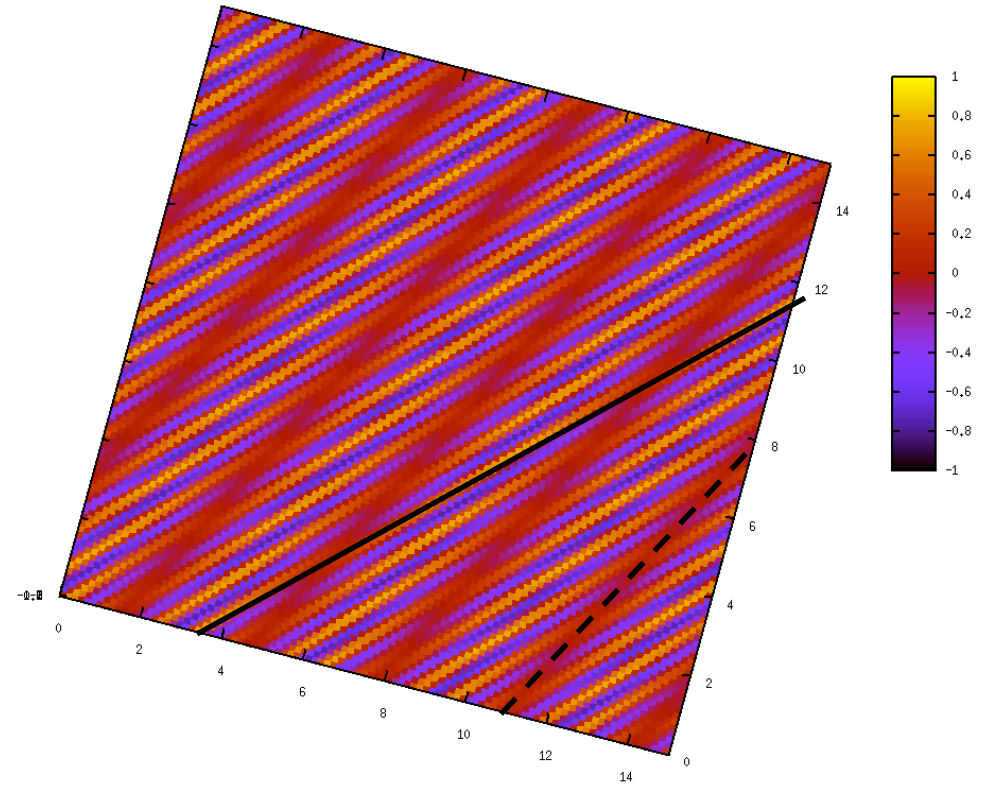
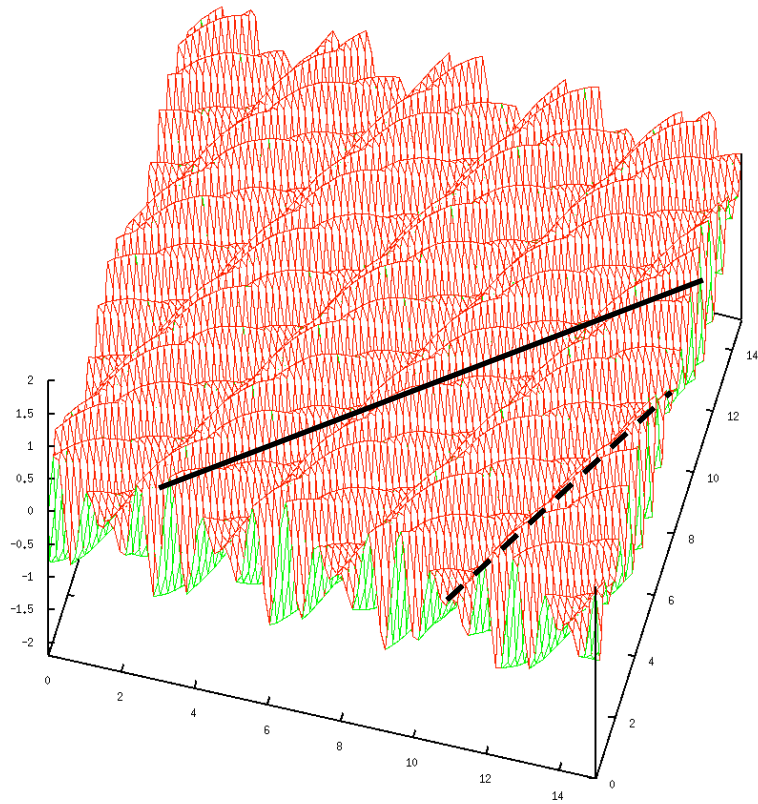


$$v_p = \omega_0 / k_0 = 1 \quad v_g = \Delta \omega / \Delta k = 1$$



- - - - group (envelope)
 ———— phase (carrier)

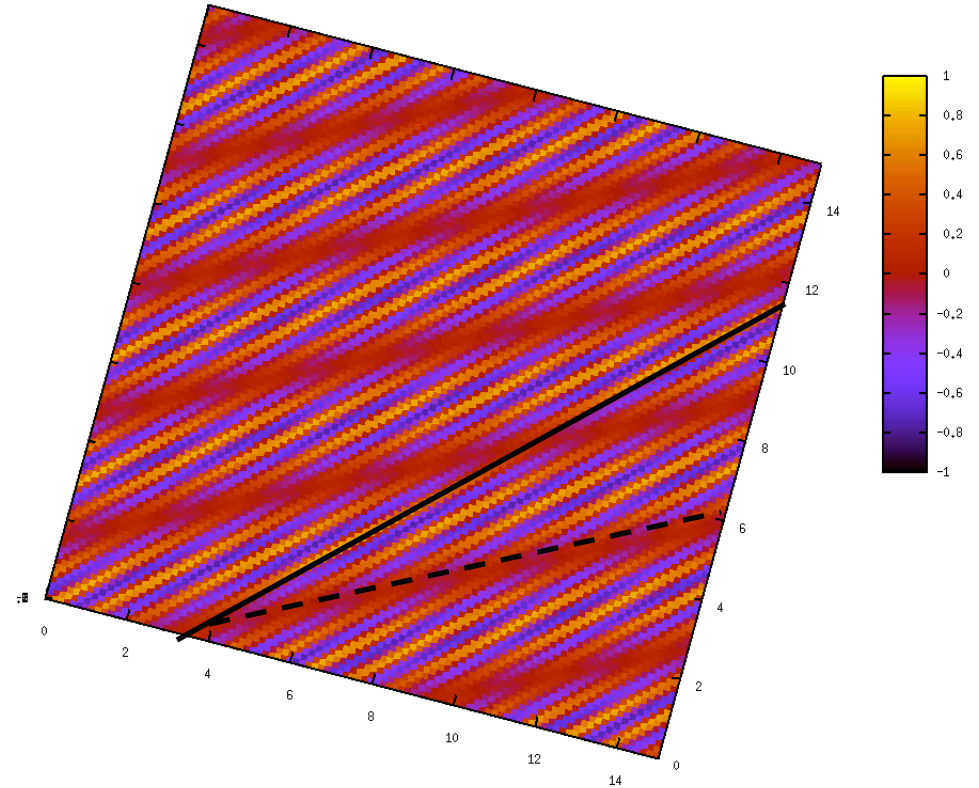
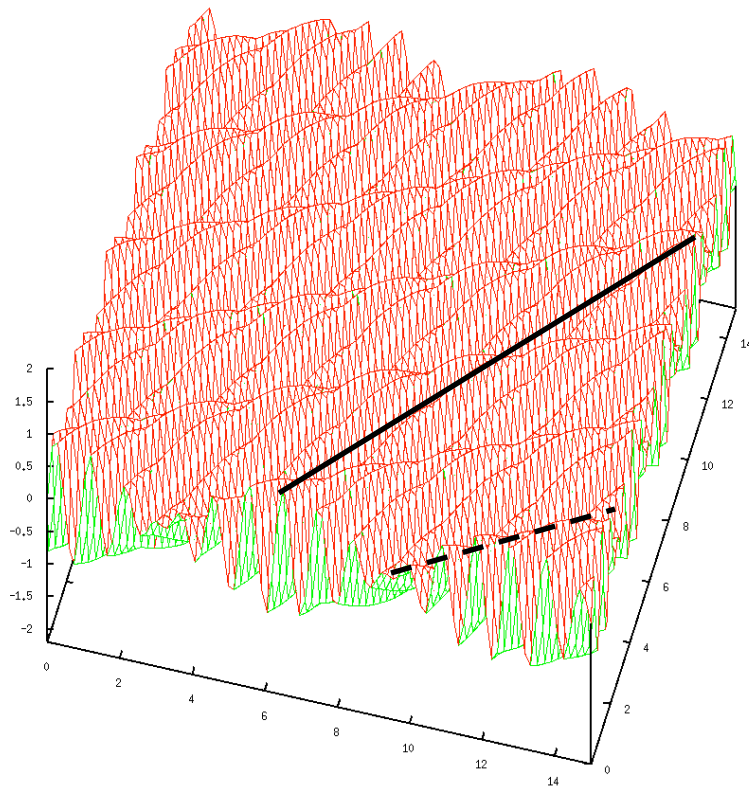
$$k_1=6, k_2=8, \omega_1=6, \omega_2=7, k_o=7, \omega_o=6.5, \Delta k=1, \Delta\omega=0.5$$



$$v_p = \omega_o / k_o = 0.93 \quad v_g = \Delta\omega / \Delta k = 0.5$$

----- group (envelope)
 ————— phase (carrier)

$$k_1=6, k_2=7, \omega_1=6, \omega_2=8, k_o=6.5, \omega_o=7, \Delta k=0.5, \Delta \omega=1$$



$$v_p = \omega_o / k_o = 1.08 \quad v_g = \Delta \omega / \Delta k = 2$$

----- group (envelope)
————— phase (carrier)