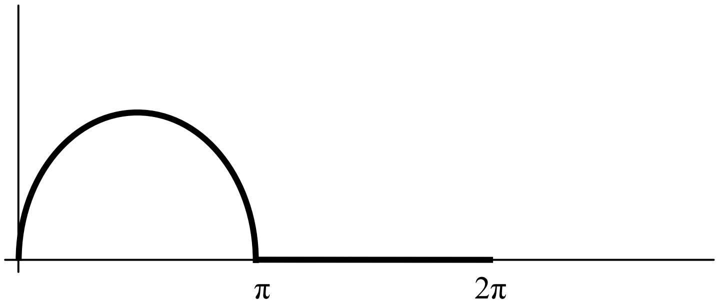


$s(t) = \sin t$ pro $t \epsilon \langle 0; \pi \rangle$

$$a_0 = \frac{1}{\pi} . \int_0^\pi \sin t . dt = \frac{1}{\pi} . [-\cos t]_0^\pi = \frac{1}{\pi} . (1+2) = \frac{2}{\pi}$$

$$a_n = \frac{1}{\pi} . \int_0^\pi \overbrace{\sin t}^{u} . \overbrace{\cos(n.t)}^{v'} . dt = \frac{1}{\pi} \left\{ \frac{1}{\pi} . \underbrace{[\sin(t) . \sin(n.t)]_0^\pi}_{=0} - \frac{1}{n} . \int_0^\pi \overbrace{\cos t}^{u} . \overbrace{\sin(n.t)}^{v'} . dt \right\} =$$

$u' = \cos t \quad v = \frac{1}{n} . \sin(n.t)$ $\qquad$ $u' = -\sin t \quad v = -\frac{1}{n} . \cos(n.t)$

$$= -\frac{1}{\pi . n} \left\{ -\frac{1}{n} . [\cos t . \cos(n.t)]_0^\pi - \frac{1}{n} . \int_0^\pi \sin t . \cos(n.t) . dt \right\} =$$

$$= \frac{1}{\pi . n^2} \left\{ (-1)^{n+1} - 1 + \int_0^\pi \sin t . \cos(n.t) . dt \right\}$$

$$I = \int_0^\pi \sin t . \cos(n.t) . dt$$

$$I = \frac{1}{n^2} . \{(-1)^{n+1} - 1 + I\}$$

$$I = \frac{(-1)^{n+1} - 1}{n^2} + \frac{1}{n^2} . I$$

$$I - \frac{1}{n^2} . I = \frac{(-1)^{n+1} - 1}{n^2}$$

$$I . \left(1 - \frac{1}{n^2}\right) = \frac{(-1)^{n+1} - 1}{n^2}$$

$$I = \frac{\frac{(-1)^{n+1} - 1}{n^2}}{1 - \frac{1}{n^2}}$$

$$a_n = \frac{1}{\pi} \cdot \int_0^{\pi} \sin t \,.\, \cos(n.t)\,.\,dt = \frac{1}{\pi}.I = \frac{1}{\pi} \cdot \frac{\frac{(-1)^{n+1}-1}{n^2}}{1-\frac{1}{n^2}}$$

$$pro\ n\ lich\acute{e}\ a_n = 0$$

$$pro\ n\ sud\acute{e}\ a_n = \frac{1}{\pi} \cdot \frac{-\frac{2}{n^2}}{1-\frac{1}{n^2}}$$

$$b_n = \frac{1}{\pi} \cdot \int_0^{\pi} \sin t \,.\, \sin(n.t)\,.\,dt = \frac{1}{\pi} \cdot \int_0^{\pi} \frac{1}{2}.[\cos(t-n.t) - \cos(t+n.t)].dt =$$

$$= \frac{1}{2.\pi} \cdot \int_0^{\pi} [\cos(t-n.t) - \cos(t+n.t)].dt$$

$$b_0 = \frac{1}{2.\pi} \cdot \int_0^{\pi} (\cos t - \cos t).dt = 0$$

$$b_1 = \frac{1}{2.\pi} \cdot \int_0^{\pi} \left[\underbrace{\cos(t-t)}_{=1} - \cos(t+t)\right] = \frac{1}{2.\pi} \cdot \int_0^{\pi} [1-\cos(2.t)].dt =$$

$$= \frac{1}{2.\pi} \cdot \left[t - \frac{\sin(2.t)}{2}\right]_0^{\pi} = \frac{1}{2.\pi}.(\pi - 0 - 0 + 0) = \frac{1}{2}$$

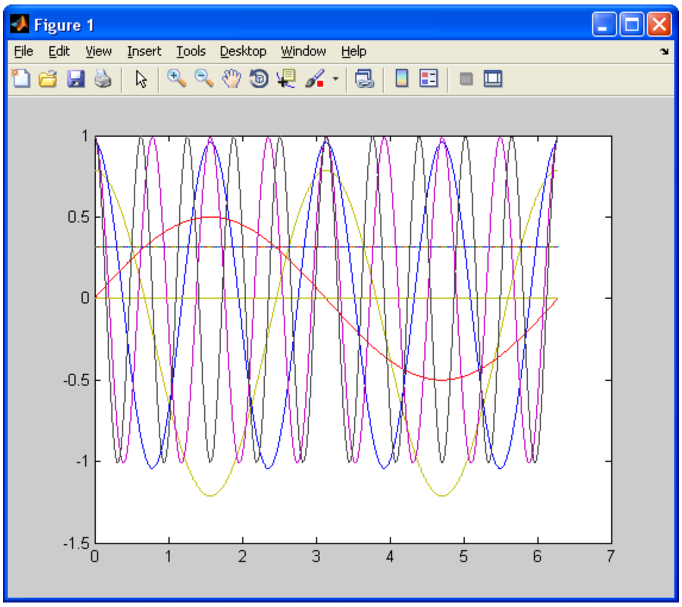
$$b_2 = \frac{1}{2.\pi} \cdot \int_0^{\pi} [\cos(t-2.t) - \cos(t+2.t)].dt = \frac{1}{2.\pi} \cdot \int_0^{\pi} [\cos(-t) - \cos(3.t)].dt =$$

$$= \frac{1}{2.\pi} \cdot \left[\frac{\sin(-t)}{-1} - \frac{\sin(3.t)}{3}\right]_0^{\pi} = 0$$

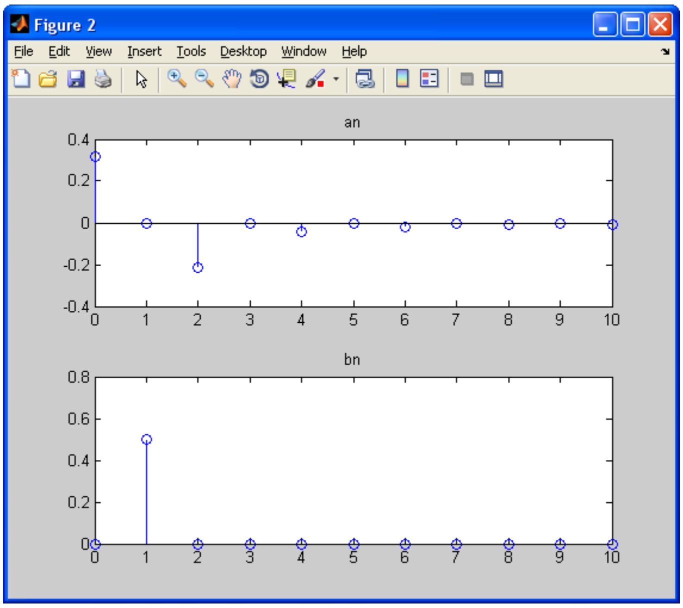
$$b_3 = 0 \ldots b_\infty = 0$$

Pro n = 10:

Harmonické složky:



Velikosti složek a_n a b_n:



Výsledný průběh: