$$\lim_{n\to\infty}\left(n^2+\sin(n+1)\right)\cdot\left(\sqrt{n^4+2}-\sqrt{n^4+1}\right)\cdot\frac{\left(\sqrt{n^4+2}+\sqrt{n^4+1}\right)}{\left(\sqrt{n^4+2}+\sqrt{n^4+1}\right)}=$$

$$=\lim_{n\to\infty}\frac{\left(n^2+\sin(n+1)\right)\cdot\left(n^4+2-n^4-1\right)}{\left(\sqrt{n^4+2}+\sqrt{n^4+1}\right)}=\lim_{n\to\infty}\frac{\cancel{n^2}}{\cancel{n^2}}\cdot\frac{\left(1+\frac{\sin(n+1)}{n^2}\right)}{\left(\sqrt{1+\frac{2}{n^4}}+\sqrt{1+\frac{1}{n^2}}\right)}\overset{\text{VOAL}}{=}$$

$$=\frac{\lim\limits_{n\to\infty}\left(1+\frac{\sin(n+1)}{n^2}\right)}{\lim\limits_{n\to\infty}\left(\sqrt{1+\frac{2}{n^4}}+\sqrt{1+\frac{1}{n^4}}\right)}\overset{\text{VOAL}}{=}\frac{\lim\limits_{n\to\infty}1+\lim\limits_{n\to\infty}\left(\sin(n+1)\cdot\frac{1}{n^2}\right)}{\lim\limits_{n\to\infty}\sqrt{1+\frac{2}{n^4}}+\lim\limits_{n\to\infty}\sqrt{1+\frac{1}{n^2}}}=$$

- $\lim\limits_{n\to\infty}\frac{1}{n^2}=0$ protože $\lim\limits_{n\to\infty}\frac{1}{n^2}=\lim\limits_{n\to\infty}\frac{1}{n}\cdot\frac{1}{n}\overset{\text{VOAL}}{=}\lim\limits_{n\to\infty}\frac{1}{n}\cdot\lim\limits_{n\to\infty}\frac{1}{n}=0\cdot0=0$
- $\lim\limits_{n\to\infty}\frac{1}{n^4}=0$ protože $\lim\limits_{n\to\infty}\frac{1}{n^4}=\lim\limits_{n\to\infty}\frac{1}{n^2}\cdot\frac{1}{n^2}\overset{\text{VOAL}}{=}\lim\limits_{n\to\infty}\frac{1}{n^2}\cdot\lim\limits_{n\to\infty}\frac{1}{n^2}=0\cdot0=0$

* Věta o mizející a omezené posloupnosti: $\lim\limits_{n\to\infty}a_n\cdot b_n=0$
pro a_n mizející a b_n omezenou posl:

$$\lim_{n\to\infty}\underbrace{\sin(n+1)}_{\text{om}}\cdot\underbrace{\frac{1}{n^2}}_{\text{mizející}}=0$$

$$=\frac{1+0}{\lim\limits_{n\to\infty}\sqrt{1+\frac{2}{n^4}}+\lim\limits_{n\to\infty}\sqrt{1+\frac{1}{n^4}}}\overset{\text{VOAL}}{=}\frac{1}{\sqrt{\lim\limits_{n\to\infty}\left(1+\frac{2}{n^4}\right)}+\sqrt{\lim\limits_{n\to\infty}\left(1+\frac{1}{n^4}\right)}}=\frac{1}{\sqrt{1}+\sqrt{1}}=\boxed{\frac{1}{2}}$$

Věta o limitě odmocniny

$1+\frac{2}{n^4}>0$

$1+\frac{1}{n^4}>0$