[redacted]

XIII $\lim\limits_{n\to\infty}\left(\sqrt[n]{n^n+n^{n+1}+\dots+n^{2n}}\cdot\frac{1}{n^2}\right)=$

$$=\lim\left(\sqrt[n]{n^n(1+n+\dots+n^n)}\cdot\sqrt[n]{\frac{1}{n^{2n}}}\right)=\lim\left(\sqrt[n]{\frac{n^n(1+n+\dots+n^n)}{n^{2n}}}\right)=$$

$$=\lim\sqrt[n]{\frac{1+n+\dots+n^n}{n^n}}=\lim\sqrt[n]{\frac{n^n\left(\frac{1}{n^n}+\frac{1}{n^{n-1}}+\dots+1\right)}{n^n}}=$$

$$=\lim\sqrt[n]{\frac{1}{n^n}+\frac{1}{n^{n-1}}+\dots+1}=1.$$

VODP: $1\le\frac{1}{n^n}+\frac{1}{n^{n-1}}+\dots+1\le n$

$$1=\sqrt[n]{1}\le\sqrt[n]{\frac{1}{n^n}+\frac{1}{n^{n-1}}+\dots+1}\le\sqrt[n]{n}=1.$$

fakt: $\frac{1}{n}\to 0.$

fakt: $\sqrt[n]{a}\to 1.$

fakt $\sqrt[n]{n}\to 1.$

$\frac{1}{n}\le 1, \Rightarrow \frac{1}{n^a}\le 1, \Rightarrow$
$\Rightarrow \frac{1}{n^n}+\frac{1}{n^{n-1}}+\dots+1\le n.$