Zadatak 14. Izračunaj:

1) $\lim\limits_{n\to\infty} \dfrac{\sin^2(n+2)}{n}$; **2)** $\lim\limits_{n\to\infty} \dfrac{\cos(n+n^2)}{n+2}$;

3) $\lim\limits_{n\to\infty} (\sqrt{n+2}-\sqrt{n+1})\cos n$; **4)** $\lim\limits_{n\to\infty} \dfrac{n+\sin n}{2n+\sin n}$;

5) $\lim\limits_{n\to\infty} \dfrac{1}{n}\cdot \operatorname{tg}\dfrac{1}{n+2}$; **6)** $\lim\limits_{n\to\infty} \operatorname{tg}\dfrac{3}{n}$.

Rješenje. **1)** $\lim\limits_{n\to\infty} \dfrac{\sin^2(n+2)}{n} = 0$ zbog $\sin^2(n+2)\in[0,1]$;

2) $\lim\limits_{n\to\infty} \dfrac{\cos(n+n^2)}{n+2} = 0$ zbog $\cos(n+n^2)\in[-1,1]$;

3) $\lim\limits_{n\to\infty} (\sqrt{n+2}-\sqrt{n+1})\cos n = \lim\limits_{n\to\infty} \dfrac{n+2-n-1}{\sqrt{n+2}+\sqrt{n+1}}\cos n = 0$ zbog $\cos n\in[-1,1]$;

4) $\lim\limits_{n\to\infty} \dfrac{n+\sin n}{2n+\sin n} = \lim\limits_{n\to\infty} \dfrac{1+\frac{\sin n}{n}}{2+\frac{\sin n}{n}} = \dfrac{1}{2}$;

5) $\lim\limits_{n\to\infty} \dfrac{1}{n}\operatorname{tg}\dfrac{1}{n+2} = 0$;

6) $\lim\limits_{n\to\infty} \operatorname{tg}\dfrac{3}{n} = 0$.

Napomena. $\lim\limits_{n\to\infty} \dfrac{\sin\frac{1}{n}}{\frac{1}{n}} = 1$.