# Seminar 8

1. Evaluati integralele improprii
   a) $\int_0^\infty \frac{\operatorname{arctg} x}{x^2+1}\,\mathrm{d}x$
   b) $\int_{-1}^1 \frac{x+1}{\sqrt{1-x^2}}\,\mathrm{d}x$
   c) $\int_0^\infty x^n \mathrm{e}^{-x}\,\mathrm{d}x, \quad n \in \mathbb{N}$
   d) $\int_1^2 \frac{1}{\sqrt{x(2-x)}}\,\mathrm{d}x$
   e) $\int_0^\infty \mathrm{e}^{-ax}\cos(bx)\,\mathrm{d}x, \quad a > 0, b \in \mathbb{R}$

2. Studiati convergenta integralelor improprii
   a) $\int_0^3 \frac{x^3+1}{\sqrt{9-x^2}}\,\mathrm{d}x$
   b) $\int_0^\infty \frac{\operatorname{arctg} x}{x}\,\mathrm{d}x$
   c) $\int_0^{\pi/2} \ln(\sin x)\,\mathrm{d}x$
   d) $\int_0^\infty x^{p-1}\mathrm{e}^{-x}\,\mathrm{d}x, \quad p \in \mathbb{R}$

3. Studiati convergenta integralei improprii

$$I(\alpha) = \int_0^1 \left(\frac{x}{1-x}\right)^\alpha \mathrm{d}x, \quad \alpha \in \mathbb{R}$$

si calculati valoarea lui $I(\frac{1}{2})$.