Rješenja prvog međuispita iz Matematike 3E i 3R
16.10.2008.

1. (2 boda)

$a_n = 0$

$b_n = 2\int_0^1 (x-1)\sin(n\pi x)dx = ... = -\frac{2}{n\pi}$

$f(x) \sim -\frac{2}{\pi}\sum_{n=1}^{\infty}\frac{1}{n}\sin(n\pi x)$

2. (5 bodova)

a) (**2b**) $\sum_{n=1}^{\infty}\frac{1}{n^4} = \frac{\pi^4}{90}$

b) (**3b**) $f(x) \sim \frac{2}{\pi^3}\sum_{n=1}^{\infty}(-1)^n\frac{n^2\pi^2+6}{n^3}\sin n\pi x$

3. (3 boda)

$B(\lambda) = 0$

$A(\lambda) = \frac{2}{\pi}\int_0^{\infty} f(\xi)\cos\lambda\xi d\xi = \frac{2}{\pi}\int_0^3 \cos\frac{\pi}{2}\xi\cos\lambda\xi d\xi = ... = \frac{4\cos 3\lambda}{4\lambda^2-\pi^2}$

$f(x) = \int_0^{\infty}\frac{4\cos 3\lambda}{4\lambda^2-\pi^2}\cos\lambda x dx$

$f(0) = 1 = 4\int_0^{\infty}\frac{4\cos 3\lambda}{4\lambda^2-\pi^2}d\lambda \Rightarrow I = \frac{1}{4}$

4. (4 boda)

a) (**2b**) str 67.

b) (**2b**) $\frac{sh\ \ t}{t}$ $\circ\!\!-\!\!\bullet$ $\int_s^{\infty}\frac{dp}{p^2-1} = \frac{1}{2}ln|\frac{s+1}{s-1}|$

$I = \frac{1}{2}ln|\frac{s+1}{s-1}|$

$F(2) = \frac{1}{2}ln3$

5. (4 boda)

a) (**1b**) str 93.

b) (**2b**) $F(s) = \frac{1}{2}t\sin tu(t)$

c) (**1b**) $F(s) = \frac{1}{2}(t-4)\sin(t-4)u(t-4)$

6. (4 boda)

a) (**2b**) str 76.

b) (**2b**) $y(t) = (3e^{5t} + \frac{e}{6}e^{5t} - \frac{e}{6}e^{-t})u(t)$

7. (3 boda) $i(t) = \delta(t) - t[u(t) - u(t-1)]$