Rješenja ponovljenog prvog međuispita iz Matematike 3E i 3R
02.02.2009.

1. (2 boda)

a) (**1b**)

$$\int_a^b f(x)g(x)\,dx = 0$$

b) (**1b**)

$$\int_{-\pi}^{\pi} \cos(2x)\cos(5x)\,dx = \cdots = 0$$

2. (2 boda)

a) (**1b**) Fourierov red i integrel, Laplaceova transformacija, str.32, Parsevalova jednakost.

b) (**1b**) Fourierov red i integrel, Laplaceova transformacija, str.28, definicija.

3. (4 boda)

$$f(x) = \frac{2}{\pi} - \frac{4}{\pi}\sum_{n=1}^{\infty} \frac{\cos(2nx)}{4n^2-1}$$

$$\sum_{n=1}^{\infty} \frac{1}{4n^2-1} = \frac{1}{2}$$

4. (3 boda)

$$f(x) = \frac{4}{\pi}\int \frac{\sin^2\left(\frac{\lambda}{2}\right)}{\lambda} \cdot \sin(\lambda x)\ d\lambda$$

Za $x = \frac{1}{2}$ slijedi

$$\int_0^{\infty} \frac{\sin^3 x}{x}\,dx = \frac{\pi}{4}$$

5. (3 boda)

a) (**1b**)

$$\frac{1}{s^2+4s+13}, \qquad \text{u gornjem području:} \qquad \frac{1}{3}e^{-2t}\sin 3t$$

b) (**2b**)

$$\frac{1}{(s-2)^2(s+3)}, \qquad \text{u gornjem području:} \qquad \frac{1}{25}\left(-e^{2t}+5te^{2t}+e^{-3t}\right)$$

6. (4 boda)

a) (**2b**) Fourierov red i integrel, Laplaceova transformacija, str.72, teorem.

b) (**2b**)

$$\int_0^{\infty} e^{-t}\frac{\sin t}{t}\,dt = \frac{\pi}{4}$$

7. (3 boda)

$$y(t) = u(t) \cdot (t-1) \sin t$$

8. (4 boda)

$$i(t) = \delta(t) - \delta(t-2) + u(t) - u(t-2)$$