Parcijalne diferencijalne jednačine
Drugi kolokvijum $\sim$ 21.6.2014.

1. Rešiti mešoviti problem:

$$u_{tt} + 4u_t = u_{xx} - 2u_x + 4u + 2(t^2-1)(1-2x) + 2x(1+4t) - 2\pi, \quad 0 < x < \frac{\pi}{2},\ t > 0$$
$$u(0,t) = \frac{\pi}{2},\ u\left(\frac{\pi}{2}, t\right) = \frac{\pi}{2}t^2,$$
$$u(x,0) = \frac{\pi}{2} - x + 4e^x \sin 3x \cos x, \quad u_t(x,0) = 3e^x \sin 4x.$$

2. Rešiti mešoviti problem:

$$u_t = 9u_{xx} - 3u, \quad 0 < x < l,\ t > 0$$
$$u(0,t) = u_x(l,t) = 0,$$
$$u(x,0) = \sin\frac{x}{2}.$$

3. Odrediti harmonijsku funkciju u oblasti $D = \{(\rho,\varphi) : \rho \geq 1,\ 0 \leq \varphi \leq \frac{\pi}{4}\}$ koja zadovoljava granične uslove

$$u_\varphi(\rho,0) - h\,u(\rho,0) = u\left(\rho, \frac{\pi}{4}\right) = 0$$
$$u(1,\varphi) = f(\varphi).$$

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