METÓDY RIEŠENIA FYZIKÁLNYCH ÚLOH zima20 – Príklady 1
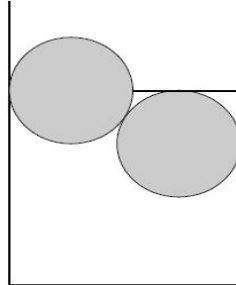
Cvičenie 24.9.2020

Príklad 1

15. Akou silou pôsobia na steny úzkej nádoby dve brvná (obr.)? Hmotnosť každého dreva je 100 kg. Jedno brvno je do polovice ponorené vo vode, vrchná časť druhého sa dotýka vodnej hladiny.
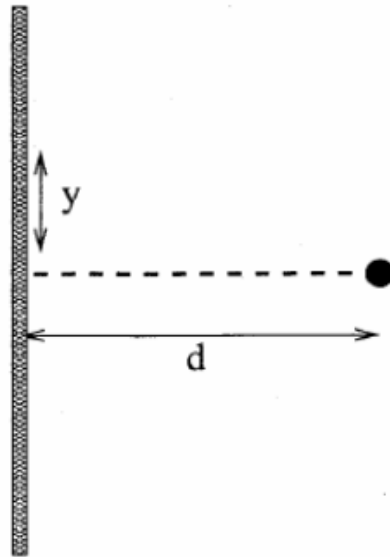

Príklad 2

2. Four identical coherent monochromatic wave sources A, B, C, D as shown below produce waves of the same wavelength λ. Two receivers R_1 and R_2 are at great (but equal) distances from B.

(a) What is the approximate relative signal size picked up by the two receivers?

(b) What is the approximate relative signal size picked up by the two receivers if source B is turned off?

(c) What is the approximate relative signal size picked up by the two receivers if source D is turned off?

(d) Which receiver can tell which source, B or D, has been turned off? Explain.
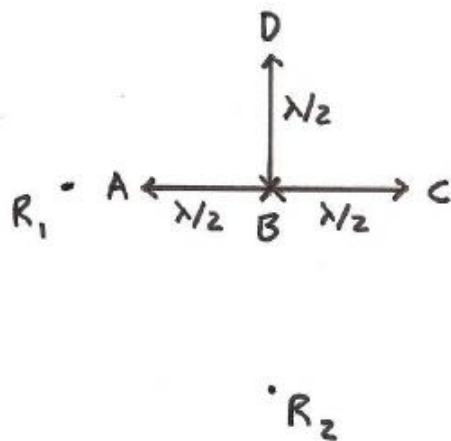
Príklad 3

A very long wire of radius a is suspended a distance d above an infinite conducting plane. In the case that $d \gg a$, find approximate expressions for

a. The capacitance per unit length of the wire, conducting plane system.

b. The surface charge density on the conducting plane as a function of y, the distance along the plane lateral to the wire.

Príklad 4

2. This is a problem where gravity is the only force present, and the particle motion is non-relativistic. Calculate the deflection angle of a test mass m which approaches a big mass M ($m \ll M$), with an impact parameter of b and a velocity of v_0 in the far past. In other words, the test mass will move in a direction in the far future that is different from the incoming direction in the far past. Compute the difference in angle between these two directions. The impact parameter b is defined as follows: think of the test mass as moving more or less along the x-axis, the big mass M is located at $x = 0$, $y = b$. Assume that the impact parameter b is large, i.e. the deflection angle is small.