6. Sphere and Cylinder (7 points) A sphere and a cylinder are lying on an inclined surface with inclination angle α. Both have mass m and radius r. The bodies are released from equal initial heights H. The moments of inertia of the sphere and the cylinder are, respectively, $I_{\text{sph}} = \frac{2}{5}mr^2$ and $I_{\text{cyl}} = \frac{1}{2}mr^2$. The coefficient of friction between the surface and the bodies is μ.

i) *(2 points)* Which of the bodies comes down faster? What was the relative lag of the slower body $\gamma = (t_2 - t_1)/t_1$? The times t_1 and t_2, respectively, denote the traveling times of the faster or the slower body. Assume that the rolling occurs without slipping.

ii) *(2.5 points)* Find the minimal angle of inclination α_0 for which the cylinder starts to slide in addition to rolling.

iii) *(2.5 points)* If $\alpha \to 90°$, the bodies obviously lose contact with the surface and fall down in free fall with equal times. What is the minimal angle of inclination α_m, for which both the sphere and the cylinder come down with equal times?