

Zad. 1 Show that Σ_n^1 and Π_n^1 classes are closed under countable unions and countable intersections. (Hint: that Σ_n^1 is closed under countable unions is easy, for countable intersections notice that you can encode countably many elements of ω^ω in one element of ω^ω).

Zad. 2 Show that Σ_n^1 and Π_n^1 are closed under taking preimages of Borel functions. (Hint: prove it for Σ_1^1 first and then use induction.)

Zad. 3 Show that for each n there is Σ_n^1 universal set. Conclude that $\Sigma_n^1 \neq \Pi_n^1$ for each n .

Zad. 4 Prove that every zerodimensional Polish space is homeomorphic to a closed subset of ω^ω . (Hint: use Luzin's scheme with clopen entries.)