Probability Theory 2

II. Midterm test   2019.05.07.

MT.1 Let $X_2, X_3 \ldots$ be independent random variables such that X_n has distribution $EXP(\log n)$.

    (a) *(7 pont)* Show that $X_n \xrightarrow{\mathbb{P}} 0$ and $X_n \xrightarrow{L^2} 0$ as $n \to \infty$.

    (b) *(13 pont)* Show that $\mathbb{P}(\limsup_{n\to\infty} X_n = 1) = 1$.
    Hint: For which values of $c > 0$ do the events $\{X_n \geq c\}$ happen infinitely often?

MT.2 *(10 pont)* Let X_1, X_2 be i.i.d random variables with distribution $UNI(0,1)$, and let $Y = \max\{X_1, X_2\}$. Find the characteristic function of Y.

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