The **Rayleigh** probability density function is defined as:

\[ p(x|\theta) = 2\theta x \exp(-x^2\theta) \quad (1) \]

with \( \theta > 0 \). What is the maximum likelihood estimate for the parameter \( \theta \) of this distribution? Given a sample \( D \) of \( n \) independent and identically distributed training examples \( x_0..x_n \) drawn from this distribution, the likelihood of \( \theta \) with respect to \( D \) is:

\[ p(D|\theta) = \prod_{k=1}^{n} p(x_k|\theta). \quad (2) \]

Remember that maximizing the **log likelihood** also maximizes the likelihood.


Please send your solutions to gchrupala@lsv.uni-saarland.de by Thursday Dec 18.