

Sums of exponential random variables are often found in applied mathematics. Their densities are known and are well documented in engineering articles. However, these articles usually lack detailed deductions. The purpose of this thesis is to give rigorous deductions of explicit formulas for densities of sums of independent exponential random variables, which are known. The thesis covers several cases depending on whether the variables have the same distribution or not. Furthermore, the thesis gives a summary of basic characteristics of exponential distribution and the relation between sums of identically distributed exponential random variables and a random variable with gamma distribution. Based on this relation the density of the sum of gamma random variables with the same intensity is given.