Seminar 1 – Assignment

- Assignment handout date 25 February 2021.
- Assignment due date 10 March 2021 (08:30).
- Please hand in your assignment as a SAS file.

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Question 1

Consider the density function for a generalised gamma distribution for non-negative x:

$$f(x) = \frac{(p/a^d)}{\Gamma(d/p)} x^{d-1} exp(-(x/a)^p),$$

with $a > 0$, $d > 0$ and $p > 0$. $\Gamma(\cdot)$ denotes the gamma function.

Write SAS IML code to calculate the quantile of the above distribution.

Note:

Write the following functions:

1. pdf_gengamma – the pdf of the generalised gamma distribution as above;
2. cdf_gengamma – the cdf of the generalised gamma distribution by using the *quad* subroutine in SAS IML;
3. quantile_gengamma – the quantile function of the generalised gamma distribution by using the **bisection method**. The bisection is discussed in Section 3.4.1 of the textbook.

Test you program:

a	d	p	u	$F^{-1}(u)$
3	5	0.7	0.98	125.33315
3	5	0.7	0.05	17.11334
3	0.5	5	0.98	3.06824
3	0.5	5	0.05	0.00679