Let us consider the Beta distribution (with parameters $\alpha_1, \alpha_2 > 0$) whose density on $[0, 1]$ given by,

$$f(x) = \frac{1}{B(\alpha_1, \alpha_2)} x^{\alpha_1 - 1}(1 - x)^{\alpha_2 - 1}, 0 \leq x \leq 1$$

where,

$$B(\alpha_1, \alpha_2) = \int_0^1 x^{\alpha_1 - 1}(1 - x)^{\alpha_2 - 1} = \frac{\Gamma(\alpha_1)\,\Gamma(\alpha_2)}{\Gamma(\alpha_1 + \alpha_2)},$$

where Γ is the gamma function.

1. Now choose five different sets of values (α_1, α_2) both positive with the condition that at least one of values of α_1 and α_2 are greater than 1.
2. For each of the values of (α_1 and α_2) evaluate the point $x^* = \frac{\alpha_1 - 1}{\alpha_1 + \alpha_2 - 2}$ at which f attains its maximum.
3. Hence find the value of f at this point and store it as c, i.e, $f(x^*) = c$ and $f(x) \leq c$, $\forall\, x$.
4. Now use the acceptance rejection method to generate values from the Beta distribution for your chosen values of α_1 and α_2.
5. Finally plot the histogram of values that you have generated in the preceding step for all your choices of α_1 and α_2.