

## Homework 1 Problem 4

**Write a test function which calls `mybeta_naive`, and compares the return to that computed by Matlab. Do the computation for  $x, y$  inputs drawn from the set  $x, y \in [0.1, 1, 10, 100]$ . What problem do you find?**

The naive function using  $\text{gamma}(x) * \text{gamma}(y) / \text{gamma}(x+y)$  breaks down for high values of  $x, y$ . Whereas Matlab's `beta()` bounds these very large or veery small results by using `exp(ln())` to control growth.

**Besides `gamma(x)`, Matlab also supplies the function `gammaln(x) = ln(G(x))`. This function is better behaved for large and small input arguments. Please use this function to write a second program called `mybeta_gammaln` which returns values for  $B(x, y)$ . Test it using your test function and compare the results against those returned by `mybeta_naive`. Which of the two computations is better behaved for large inputs?**

`mybeta_gammaln` is better behaved for large inputs because, like Matlab's `beta()`, it's using `exp(ln())` to bound the results.