Concordia University

SOEN 6011 - Software Engineering Process

ETERNITY : FUNCTIONS
Function 6 : B(x,y)

Problem Solution 1

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1 Introduction

1.1 Description

The Beta function defines the association between set of input and the corresponding output. Each of the input value in beta function is strongly associated with one output value. It is also known as Euler integral of the first kind. It is defined as follows :

$$B(x,y) = \int_0^1 t^{x-1}(1-t)^{y-1}dt$$

where, $x > 0$ and $y > 0$

1.2 Domain

$$x \in R$$

and

$$y \in R$$

1.3 Co-Domain

$$0 \leq y \leq \pi$$

or

$$0^\circ \leq y \leq 180^\circ$$

1.4 Characteristic

- Beta function is a symmetric function : $B(x,y) = B(y,x)$
- Beta function shares a close relationship to the gamma function :

$$B(x,y) = \frac{\Gamma x \Gamma y}{\Gamma(x+y)}$$

- When $x \leq 0$ and $y \leq 0$ then the function follows gamma form.
- The beta function can take multiple parameters as input to the function.

2 Context of use model

- **User**: A user who wish to use the calculator in order to compute beta function: $B(x, y)$. The input will be x and y.
- **Task**: Compute the Beta function and show the output on the screen.
- **Environment**:
  - **Technical environment**: The calculator needs power in order to calculate the Beta function.
  - **Non-technical environment**: The location from where the user is operating the calculator.

Bibliography

[1] Wikipedia,
https://en.wikipedia.org/wiki/Beta_function