CORDIC Algorithm

Background and Simulation Task

# CORDIC Algorithm

The CORDIC is a class of hardware-efficient algorithms for the computation of trigonometric and other transcendental functions that use only shifts and adds to perform. The CORDIC Algorithm is a unified computational scheme to perform

* computations of the trigonometric functions: sin, cos and arctan
* computations of the hyperbolic trigonometric functions: sinh, cosh and arctanh
* and consequently can also compute the exponential function, the natural logarithm and the square root
* multiplication and division

Ignoring the mathematics, the CORDIC can be implemented as Table 1., where constants K = 1.646760258121 and K’ = 0.8281593609602.

Table 1. CORDIC Summary

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | | |  | | |
| Trigonometric | Calculations | | | Calculations | | |
| Initialization | Results | | Initialization | Results | |
| Extended | | | Extended | | |
|  | | |  | | |
| Linear | Calculations | | | Calculations | | |
| Initialization | | Results | Initialization | | Results |
| Extended | | | Extended | | |
| NA | | | NA | | |
| Hyperbolic | Calculation | | | Calculation | | |
| Initialization | | Results | Initialization | | Results |
| Extended | | | Extended | | |
|  | | |  | | |

Task 1

Write the structure description and design documents for CORDIC. And write the code in MATLAB formation with the Matlab form with matrix, vector, and functions.