

NYSTRÖM METHOD FOR SOLVING NON-UNIQUELY SOLVABLE INTERIOR  
RIEMANN-HILBERT PROBLEM ON REGION WITH CORNERS  
VIA INTEGRAL EQUATION

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To Prophet Muhammad (pbuh),  
A person whom I love more than myself,  
And my loving mother Hj Habsa Mustafa and two children  
( Shko & Shyar) and my Wife and in memory my late father  
( Hassan Jaff )

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## ABSTRACT

This work involve a boundary integral equation method to find the non-uniquely solvable numerical solution of the Interior Riemann-Hilbert problem on a region with corners. The integral equation was derived based on the Fredholm integral equation of the second kind with continuous kernel and the solvability of the integral equation and its equivalence to the problem is reviewed the derived integral equation in this research for the non-uniquely solvable interior Riemann-Hilbert problem on a region with corners will be computed in achieving this aim, this study developed two numerical formulas where the Nystrom method with the Gaussian quadrature rule are implemented. So that, the singularities are eliminated during numerical integration. Numerical examples on four test regions with Off-corners are presented to demonstrate the effectiveness of this formulation.

## ABSTRAK

Kerja ini membangunkan satu kaedah sempadan persamaan kamiran untuk penyelesaian berangka masalah Interior Riemann-Hilbert di rantau dengan off-sudut berasal dalam disertasi ini berdasarkan persamaan Fredholm penting jenis kedua dengan kernel berterusan. Kelarutan persamaan kamiran dikaji dan bukti kesetaraan kepada masalah ini disediakan. Persamaan kamiran yang diperolehi kemudiannya digunakan untuk menyelesaikan berangka bukan unik larut dalaman Riemann-Hilbert masalah. Dalam mencapai matlamat ini, tepat skim berangka maju di mana kaedah Nystrom dengan peraturan kuadratur Gaussian dilaksanakan. Oleh itu, singularities dihapuskan semasa kamiran berangka. Di samping itu, satu formula digunakan untuk penyelesaian menyisipkan pada setiap titik sudut luar yang menggunakan nilai-nilai yang diperolehi di luar penjuru mata, iaitu formula interpolasi Nystrom. Contoh berangka kepada empat kawasan ujian dengan Off-sudut dibentangkan untuk menunjukkan keberkesanan penggubalan ini.