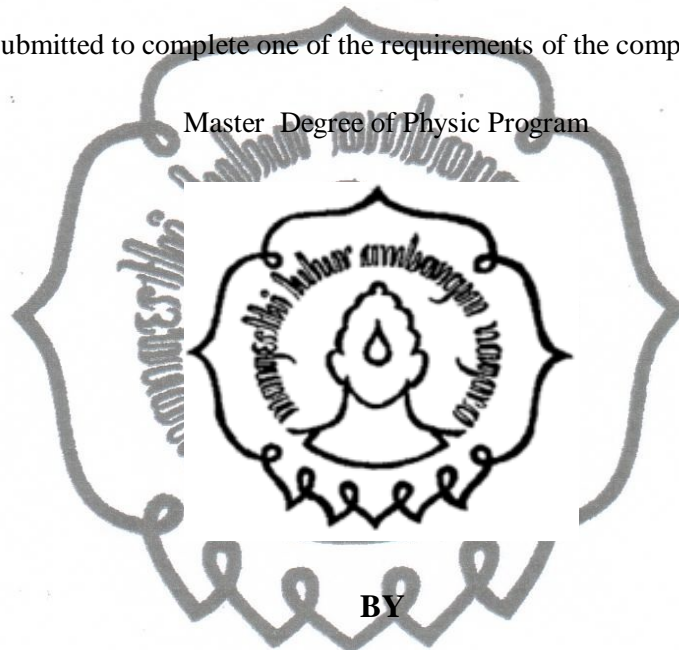


**NON-RELATIVISTIC ENERGY SPECTRA AND WAVE
FUNCTION ANALYSIS OF MANNING-ROSEN PLUS
TRIGONOMETRIC SCARF NON- CENTRAL POTENTIAL
USING ROMANOVSKI POLYNOMIALS**

A THESIS

Submitted to complete one of the requirements of the completion of

Master Degree of Physic Program



BY

SELSABIL HISSEN

S911202013

**PROGRAM PASCASARJANA
UNIVERSITAS SEBELAS MARET
SURAKARTA**

2014

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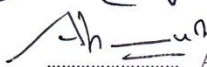
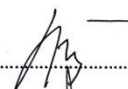
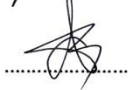
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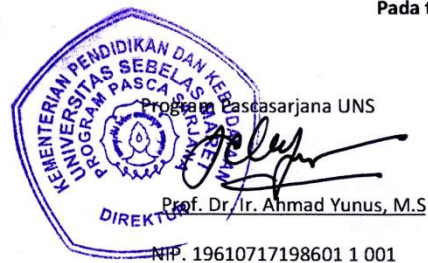
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Sincerely,

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ABSTRACT

This research is aimed to determine non-relativistic energy spectra and wave function analysis of Schrodinger equation for Manning-Rosen plus trigonometric Scarf non-central potential and Scarf plus trigonometric Manning-Rosen non-central potential

The approximate analytical solution of Schrodinger equation for Manning-Rosen plus trigonometric Scarf non-central potential and Scarf plus trigonometric Manning-Rosen non-central potential are investigated using Romanovski polynomial. The approximate bound state energy eigenvalues are given in the close form, the corresponding approximate radial eigenfunctions is formulated in term of Romanovski polynomials, and the angular wave function is also expressed in term Romanovski polynomial. The effect of the presence of trigonometric potential changes the state of angular wave function level.

Keywords: Schrödinger equation, Scarf potential, Manning-Rosen potential, finite Romanovski polynomials method.

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LIST OF SYMBOLS

K = wave number

V = energy potential

E = the energy of the wave

(x,y,z) = Cartesian coordinate

(r, θ, φ) = spherical coordinate

Ψ = wave function

$\hbar = \frac{h}{2\pi}$ = planck constant = $1,05 \times 10^{-34} \text{ j. s} = 6,58 \times 10^{-19} \text{ eV. s}$

$\lambda = \frac{2\pi}{k}$ = wave length

m_e = elementary partical mass

n = primary quantum number

n_r = radial quantum number

n_l = polar quantum number

l = orbital quantum number