بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / حسام الدين محمد مغربي

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات : لا يوجد

INCREASING TRANSMITTED POWER WITH COST MITIGATION VIA MODIFIED EHV POWER LINES IN EGYPTIAN GRID

By

Ahmed Taleb Mohamed Mohamed Shebl

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
Electrical Power and Machines Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
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Title of Thesis:

INCREASING TRANSMITTED POWER WITH COST MITIGATION VIA MODIFIED EHV POWER LINES IN EGYPTIAN GRID

Key Words:
Charge Simulation Method; Hybrid Power Lines; Electric Fields; Egypt Electric Grid; Cost.

Summary:
Our thesis introduces suggested solutions and alternatives for increasing the transmission capacity of the existing lines with the optimum cost. This requires to evaluate the electric field profiles between and closed to submitted hybrid and HVDC power lines in Egyptian grid and the cost of the different proposed alternatives. Four alternatives will be patterned and modeled. Numerical technique will be applied to estimate the field profiles beside and among the presented lines. The technique is the charge simulation method (CSM) for electric field estimation. The simulations and analysis will be performed using a computer program performed by attractive packages such as MATLAB.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Ahmed Taleb Mohamed Mohamed Date: .../.../2022

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Ahmed Taleb Mohamed Mohamed

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List of Abbreviations

2-D	Two Dimension
3-D	Three Dimension
ACSR	Aluminum Conductor Steel Reinforced
ACSS	Aluminum Conductor Steel Supported
AFUDC	Allowance for Funds Used During Construction
AWG	American Wire Gauge
BEM	Boundary Element Method
CSM	Charge Simulation Method
DWT	Discrete Wavelet Transform
EHVDC	Extra High Voltage Direct Current
EMTP	Electromagnetic Transients Program
FACTS	Flexible AC Transmission Systems
FDM	Finite Difference Method
FEM	Finite Element Method
FERC	Federal Energy Regulatory Commission
FLA	Full Load Adjustment
HB-MMC	Half-Bridge Multi-Level Converter
HTLS	High Temperature Low Sag
HVDC	High Voltage Direct Current
INCIRP	International Commission on Non-Ionizing Radiation Protection
IOES	Integrated Optical Electric Field
KSA	Kingdom of Saudi Arabia
MCM	Monte Carlo Method
MISO	Midcontinent Independent System Operator
MLPG	Meshless Local Petorv-Galerkin
MTEP	Midcontinent Transmission Expansion Plan
OHL	Overhead Line

PEA	Rovincial Electricity Authority
PSCAD	Power System Computer-Aided Design
PSO	Practical Swarm Optimization
RES	Renewable Energy Source
RMS	Root Mean Square
ROW	Right of Way
SCSM	Surface Charge Simulation Method
SER	Shielding Failure Rate
SFFOR	Shielding Failure Flashover Rate
SVM	Supper Vector Machine
T&D	Transmission and Distribution
TEP	Transmission Expansion Planning
TT	Time-Time
UHV	Ultra-High Voltage
UHVDC	Ultra-High Voltage Direct Current
WECC	Western Electricity Coordinating Council

List of Symbols

Greek

α	temperature coefficient
ϵ	emissivity
μ_f	absolute viscosity
ω	angular frequency
ϕ	power factor angle
ρ_f	density of air
θ	phase shift angle
T_θ	operating temperature

Latin

D	conductor diameter
E	energy losses cost
f	frequency
F_n	future value or accumulated amount
I_{ac}	ac current per conductor
I_c	conductor current
I_{dc}	dc current per conductor
k_f	thermal conductivity of air
N	number of charges
n	number of years from today
n_b	number of bundles
n_{ckt}	number of circuits
n_p	number of phases/poles
P	present value or one-time investment today
P_{ac}	ac power per conductor
$P_{c.l}$	converter power losses