

Abbreviations

ACC Air-Cooled Condenser

ACHE Air-Cooled Heat Exchanger

ADC Analog-to-Digital Converter

AGMD Air Gap Membrane Distillation

ANN Artificial Neural Network

BC Brine Concentration

BPE Boiling Point Elevation

CC Combined Cooler

CCS Combined Cooling System

CF Cascade-forward

CSP Concentrated Solar Power

CSP+D Concentrated Solar Power + Desalination

CST Concentrated Solar Thermal

CSTR-SA Self-Adaptive Constraint handling algorithm

DC Dry Cooler

DCMD Direct Contact Membrane Distillation

DE Differential Evolution algorithm

DEAHP Double-Effect Absorption Heat Pump

DE-CSTR Differential Evolution with self-adaptive Constraint Handling algorithm

DoE Design of Experiments

Dof Degrees of Freedom

ES Evolutionary Strategy

FAIR Findable, Accessible, Interoperable, Reusable

FF Feed Forward

FO Forward Osmosis

FSM Finite-State Machine

GA Genetic Algorithm

GACO Generalized Ant Colony Optimization algorithm

GHG Greenhouse Gas

GOR Gain Output Ratio

GP Gaussian Process

GPR Gaussian-Process Regression

hex Heat Exchanger

IEA International Energy Agency

IHS Improved Harmony Search algorithm

IRENA International Renewable Energy Agency

ITD Initial Temperature Difference

KPV Key Process Variable

LCOE Levelized Cost of Electricity

LCOW Levelized Cost of Water

LMTD Logarithmic Mean Temperature Difference

LT Low Temperature

MAE Mean Absolute Error

MAPE Mean Absolute Percentage Error

MD Membrane Distillation

MED Multi-Effect Distillation
med Separation subsystem
MIMO Multiple Inputs Multiple Outputs
MINLP Mixed Integer Non-Linear Programming
MLD Minimum Liquid Discharge
MPC Model Predictive Control
MRE Mean Relative Error
MSE Mean Squared Error
MSF Multi-Stage Flash
MVC Mechanical Vapor Compression

NEA Non-Equilibrium Allowance
NF Nanofiltration
NLP Non-Linear Programming
nNLP problems n Non-Linear Programming problems
NTU Number of Transfer Units

O&M Operation and Maintenance

P&ID Piping and Instrumentation Diagram
PI Proportional-Integral controller
PID Proportional-Integral-Derivative controller
PR Performance Ratio
PRBS Pseudo-Random Binary Sequence
PSA Plataforma Solar de Almería
PSO Particle Swarm Optimization algorithm
PT Parabolic Trough
PT100 Platinum temperature transducer, 100 ohms at 0 $^{\circ}\text{C}$
PV Photovoltaic

RBF Radial Basis Function
REE Red Eléctrica de España
RI Reconcentration Index
RMSE Root Mean Squared Error
RO Reverse Osmosis
RR Recovery Ratio
RRmax Maximum Recovery Ratio
RSI Ryznar Stability Index
RTO Real-Time Optimization

SA Sensitivity Analysis
SC Surface Condenser
SEA (N+1)-ES Simple Evolutionary algorithm
SEA-CSTR (N+1)-ES Simple Evolutionary algorithm with self-adaptive Constraint Handling
SEEC Specific Electrical Energy Consumption
SEXC Specific Exergy Consumption
sf Solar Field
sfts Solar Field and Thermal Storage subsystem
SGA Simple Genetic Algorithm
SGMD Sweeping Gas Membrane Distillation
SI Sensitivity Index
SolarMED A system that uses a combination of a thermal solar field and a thermal storage system as heat source to produce separation using a multi-effect distillation system.
ST Solar Tower
STEC Specific Thermal Energy Consumption

TBT Top Brine Temperature
TDS Total Dissolved Solids
TF Transfer Fluid
TL;DR Too Long; Didn't Read

TMY Typical Meteorological Year
TOC Table of Contents
ts Thermal Storage
TSP Traveling Salesman Problem
TTD Terminal Temperature Difference
TVC Thermal Vapor Compression

VC Vapor Compression
VFD Variable Frequency Drive
VMD Vacuum Membrane Distillation

WCT Wet Cooling Tower
WH Waste Heat

ZLD Zero Liquid Discharge