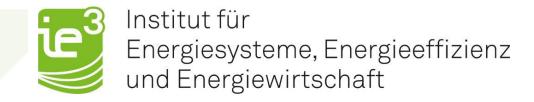
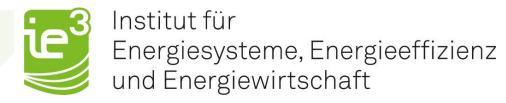


Input data



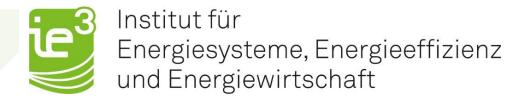
- input_data/conductor_parameters.mat:
 Contains parameters of various aluminum-steel conductors from IEC EN 50182-2001 and several custom types.
- input_data/weather_parameters.mat:
 Contains the weather scenarios used by German transmission system operators (TSO) in 2018.
- common_parameters.mat:
 Additional parameters taken from IEEE 738-2012
- all .mat-files contain a Header table including symbols, descriptions and units

Variables Conductor Parameters



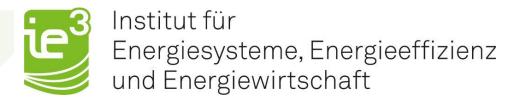
Symbol	Description	Unit
Spec	Line name	
D	Outside diameter of conductor	m
R_DC	DC resistance of conductor	Ohm/m
R_AC	AC resistance of conductor	Ohm/m
M1	weight of aluminium strands	kg/m
M2	weight of steel strands	kg/m
I_r	rated current at standard environment circumstances	А
T_max	maximum temperature	°C

Variables Weather Parameters



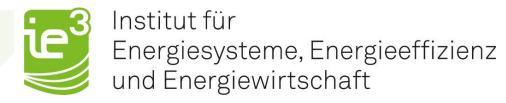
Symbol	Description	Unit
Number	weather scenario number according to German TSO specifications	
V_w	wind speed	m/s
Phi	angle of wind	o
T_a	ambient temperature	°C
PATL	factor for increasing rated current	%

Variables Common Parameters



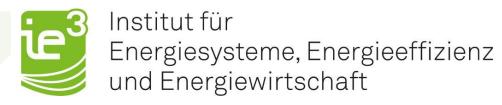
Symbol	Description	Unit
Cp1	heat capacity of aluminium	J/(kg*K)
Cp2	heat capacity of steel	J/(kg*K)
Epsilon	emissitivity	
Не	elevation of conductor above sea level	M
Q_se	Total solar and sky radiated heat intensity corrected for elevation	W/m^2
alpha	resistance coefficient	1/K
alpha_s	solar absorptivity	

Variables in Functions



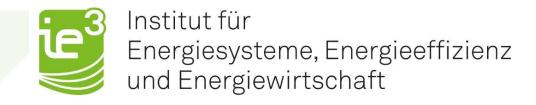
Symbol	Description	Unit
I_PATL	Permanently admissible current at max. conductor temperature	А
I	Current through conductor	Α
I_prefault	Current through conductor before event occurrence	А
I_postfault	Current through conductor after event occurrence	Α
T_s	Conductor surface temperature	°C
T_steady	Conductor temperature in steady state	°C
T_end	(Desired) conductor temperature at the end of a TATL timeframe	°C
T_start	Conductor temperature at the beginning of TATL timeframe	°C
T_end_steady	Stationary conductor temperature at I_postfault	°C
t_end	Length of TATL timeframe	min
T	Timestamp	min
idx_line	Row number of conductor type in Leitungsparameter	Integer
idx_weather	Row number of conductor type in Wetterparameter	Integer
preloading	Loading of conductor before event occurence	Double





Funktion	Eingangsdaten	Ausgangsdaten	Beschreibung
PATLTherm	T_s, D, R_ac, V_w, Phi, T_a, Epsilon, He, Q_se, alpha, alpha_s	I_PATL (double)	Determines the permanently admissible current (PATL)
TATLTherm	D, R_ac, V_w, Phi, T_a, Epsilon, He, Q_se, alpha, alpha_s, M1, M2, Cp1, Cp2, I_prefault, t_end, T_end	I_TATL (double)	Returns the maximal admissible constant current leading to the desired end temperature at the end of the timeframe. May return NaN if T_end cannot be reached (i. e. too short cool down time frame)
SteadyLineTemperature	D, R_ac, V_w, Phi, T_a, Epsilon, He, Q_se, alpha, alpha_s, I	T_steady (double)	Returns the stationary conductor temperature
TransientLineTemperature	Mandatory: D, R_ac, M1, M2, V_w, Phi, T_a, Cp1, Cp2, Epsilon, He, Q_se, alpha, alpha_s, T_start, I_postfault, t_end Optional: 'Adiabatic', true	<pre>result.T_start (double) result.T_end (double) result.T_steady (double) result.T_s (array) result.t (array)</pre>	Returns the time-dependent line temperature for a given timeframe Use "Adiabatic', true" for fault currents
TATL_Zeitreihen			Script that returns the TATL and PATL for all conductors, weather situations, preloadings and different TATL timeframes as .mat and .xlsx

Auxiliary Functions



Funktion	Eingangsdaten	Ausgangsdaten	Beschreibung
GetLineParameters	<pre>idx_line, Leitungsparameter (table)</pre>	D R_ac M1 M2 T_max	Returns the conductor parameters from Leitungsparameter table
GetWeatherParameters	<pre>idx_weather, Wetter (table)</pre>	T_a V_w Phi	Returns the conductor parameters from Wetterparameter table
GetPreFaultCurrent	<pre>idx_line idx_weather preloading Leitungsparameter (table) Wetterparameter (table)</pre>	I_prefault	Returns the current before event occurence depending on the loading