

Description of the parameters that make up the individual columns in the “Simulation_Parameters.xlsx” file.

Details see: https://github.com/PHM-Hochschule-Esslingen/Bearing_Simulation_Model

Parameter / column	Unit	Description
number	1	Consecutive number of the bearings to be simulated, no effect on the simulation
simulation_name	-	Name of each individual bearing to be simulated. Is used in the name of the saved data file
Bearing Parameters (BP)		
BP_name	-	Name of the simulated bearing type
BP_d	mm	Roller diameter of the respective bearing
BP_D	mm	Pitch circle diameter of the respective bearing
BP_n_roller	1	Number of rolling elements of the respective bearing
BP_alpha	° (degree)	Contact angle of the respective bearing
BP_C	N	Dynamic load rating (provided by the bearing manufacturer)
BP_p	1	Exponent of the L_{10m} rating life equation ($p_{ball} = 3$, $p_{roller} = 10/3$)
BP_b_form	1	Shape parameter of the three-parameter Weibull distribution (For ball BP_b_form = 1.1, for roller BP_b_form = 1.35)
Operating Conditions (OC)		
OC_load_mean	N	Expected load ($E[L]$) during operation of the bearing
OC_load_std	N	Standard deviation of the load ($\sqrt{\text{Var}[L]}$) during operation of the bearing
OC_a_ISO	1	Life modification factor (see ISO 281:2007), when bearing is operated in accordance with established guidelines: $a_{ISO} = 1$
OC_f_set	Hz	Set (expected) rotational frequency of the inner race
OC_f_d	Hz	Frequency deviation with respect to f_{rot}
OC_f_m	1	Number of deviations per revolution of the inner race
OC_f_sampling	Hz	Sampling frequency of the simulated vibration signal (i.e., sampling frequency of the acceleration sensor)
OC_T_measure_deg	min	Time interval between two vibration measurements
OC_T_measure_acc	s	Duration of one simulated vibration measurement
Simulation Details (SD)		
SD_degradation_progression	-	Predefined progression function. Select one of the following strings: “linear_increasing”, “progressively_increasing”, “step_like”, “gamma” Please note: correct spelling!
SD_gamma_process_alpha	1	Corresponds to α_γ , only required for SD_degradation_progression=gamma
SD_gamma_process_beta	1	Corresponds to β_γ , only required for SD_degradation_progression=gamma
SD_slip_mean	1	Constant deviation between two consecutive impacts, factor of the theoretical inter-arrival time (e.g., 0.01 means 1 % deviation)
SD_SDOF_m	kg	Mass of the single-degree-of-freedom (SDOF) oscillating system
SD_SDOF_k	N/m	Stiffness of the SDOF oscillating system
SD_SDOF_c	Ns/m	Damping coefficient of the SDOF oscillating system
SD_SNR	dB	Signal-to-noise ratio for the simulation of measurement noise