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Ferraris

Galileo Ferraris' Contest rules

April 17, 2024



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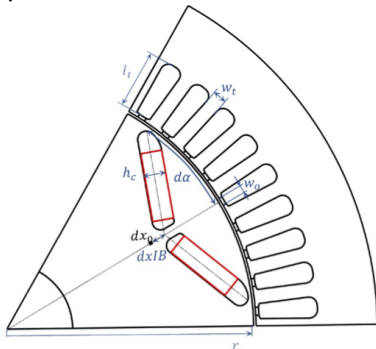
- results datasets will be provided on *three families* of motors *A*, *B* and *C*
- each family of motor is referred to a *target* performance
- external dimensions (stator radius and stack length) are defined for each family of motors *A*, *B* and *C*

Family		A	B	C
<i>target</i>		Tesla Model3	Prius2010	???
Rated torque	[Nm]	236	87	-
Rated power	[kW]	120	36.9	-
Max. speed	[rpm]	15000	13500	-
Stator				
outer diameter	[mm]	225	264	-
Stack length	[mm]	134	50	-



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- for each motor family, a *parametric* geometry is defined that can be represented as a point in a p dimensional real space
- N points will be generated \mathbf{x}_k , $k = 1 \div N$ corresponding to N motor configurations
- internal consistency rules are checked to ensure that each point is leading to a *feasible* motor structure. Unfeasible points are removed from dataset.



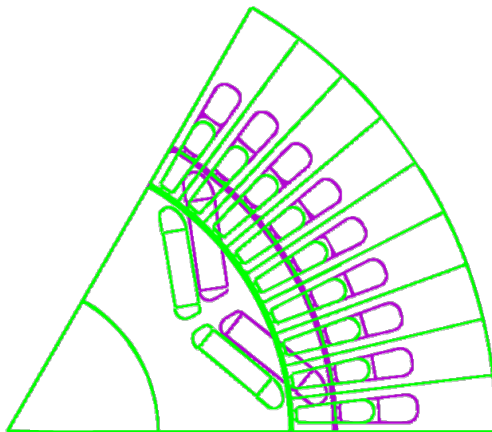


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changing rotor radius

Family motor A

rotor slot angle $d\alpha = 77^\circ$, rotor radius $r = 65, 75\text{mm}$

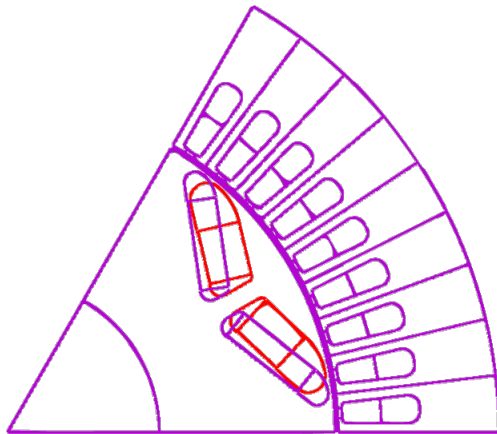




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Family motor A

rotor slot angle $d\alpha = 65 \div 77^\circ$, rotor radius $r = 75\text{mm}$





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- research groups taking part in the contest should:
 - ① build one or more methods to surrogate the relations between the input parameters and the result dataset;
 - ② use *complete* datasets from two families of motors (A and B) to tune their data-driven procedures;
 - ③ apply them on a third motor C where a partial dataset is provided;
 - ④ predict some key performance indicators on motor C , as specified later;
 - ⑤ provide to the Organizing Committee the procedures they developed;
 - ⑥ explain the methodologies used to reach the results.



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- procedures will be rerun and results will be evaluated on the basis of accuracy, computational cost and degree of innovation in methods.
- a set of *metrics* to evaluate accuracy of estimated KPI will be used, for instance assessing Pareto front by Reverse generational distance(RGD), Spacing (S), Error ratio (ER), etc.