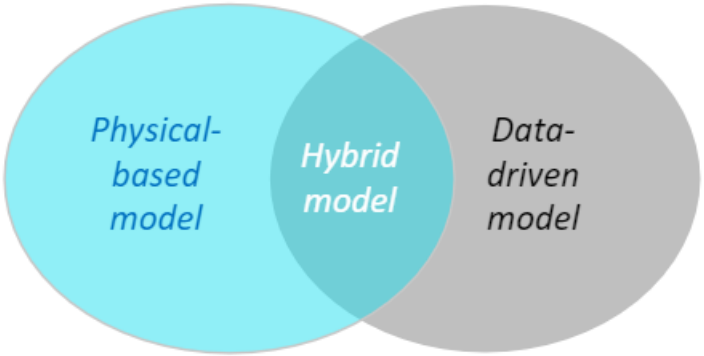
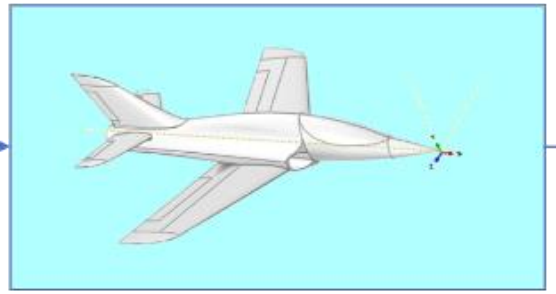
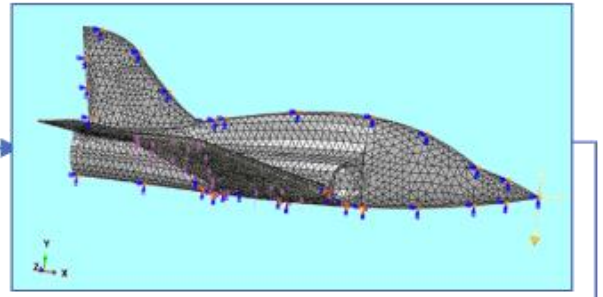

HYBRIDNÍ MODELOVÁNÍ
ŠKOLENÍ PREZENTAČNÍCH DOVEDNOSTÍ
MAREK
9. LISTOPADU 2023

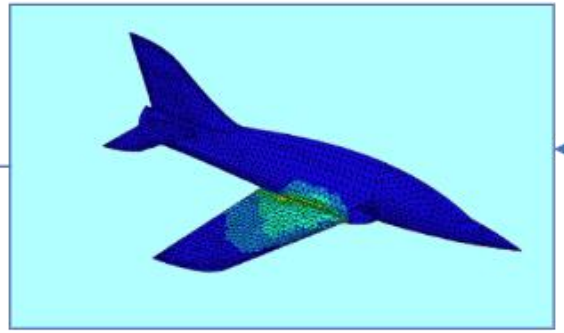
HYBRIDNÍHO MODELOVÁNÍ A JEHO CYKLUS

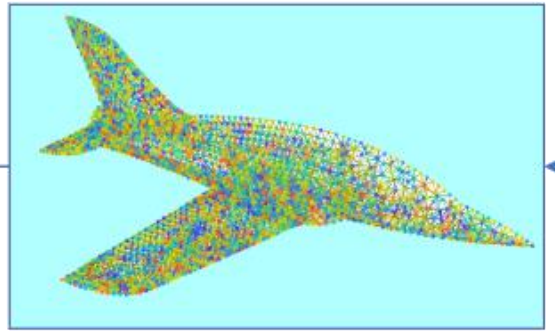


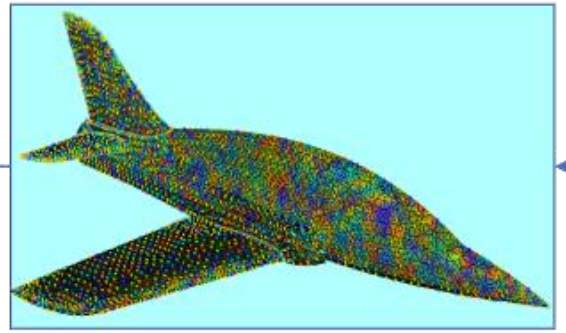

Real Product


Geometric Model Γ

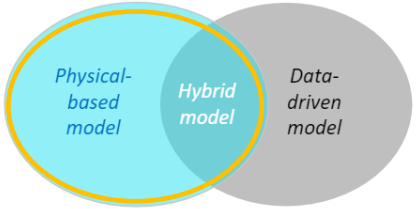

Physical Model Ω


Physcal Model Evaluation *D*


Graph Regressor *G*

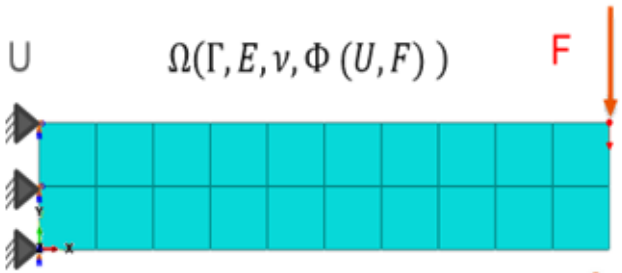

Digital Twin

FYZIKÁLNÍ MODELOVÁNÍ

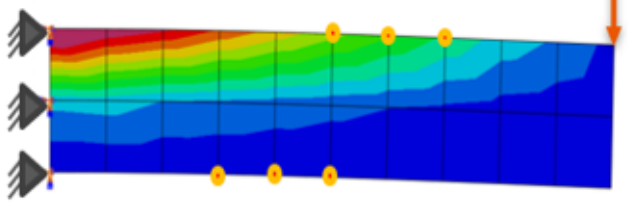


Physical − based model via finite element method

U $\Omega(\Gamma, E, \nu, \Phi\,(U, F)\,)$ F

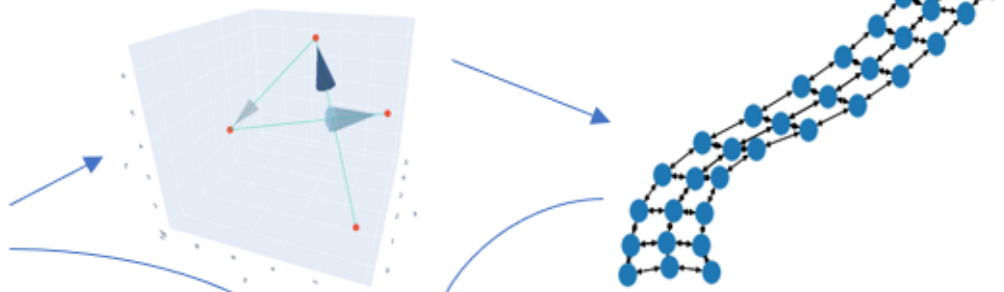


U $x = (x_1, \ldots x_m)$ F

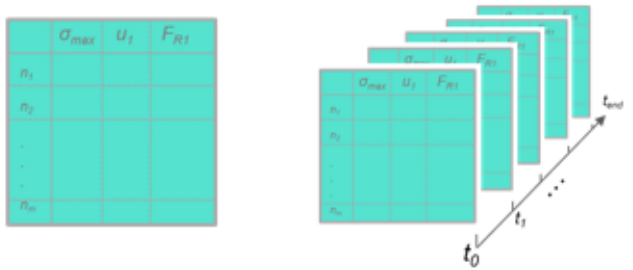


$y = \sigma_n, where\ n = 1, \ldots, N$

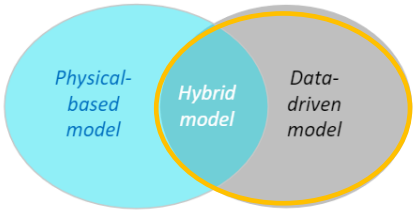
Processing graph from FE model



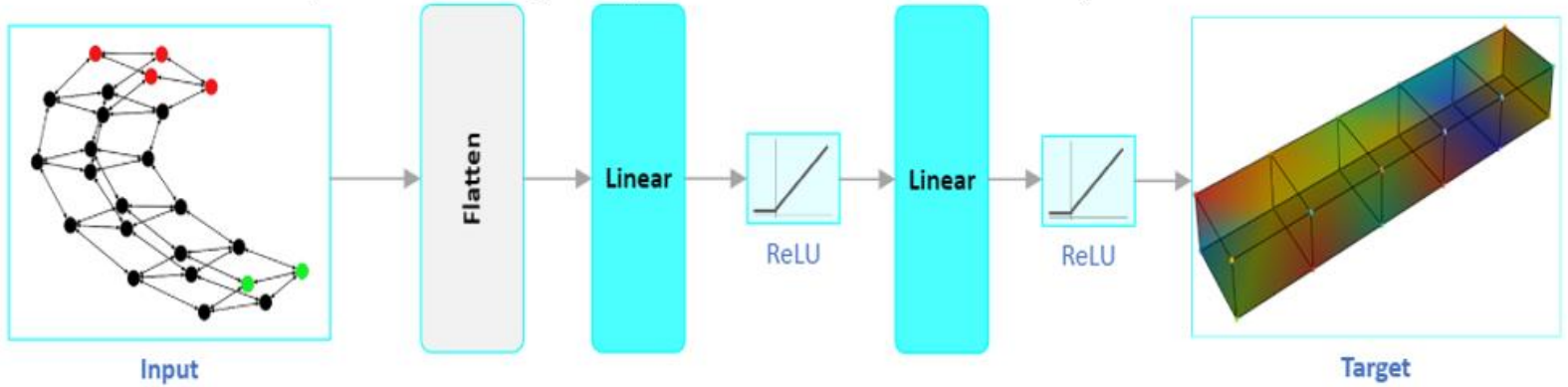
Distilled dataset



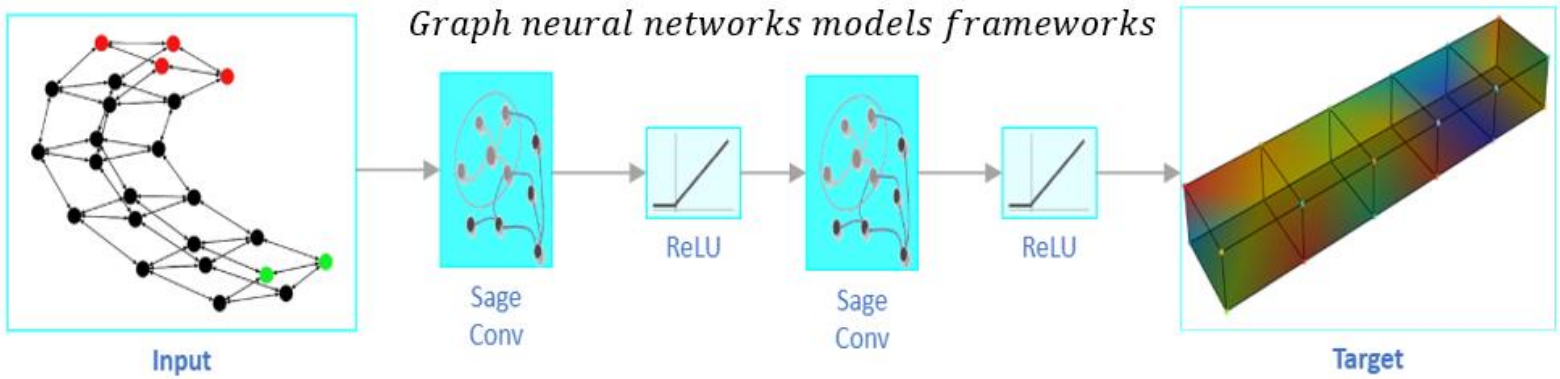
DATY ŘÍZENÉ MODELOVÁNÍ



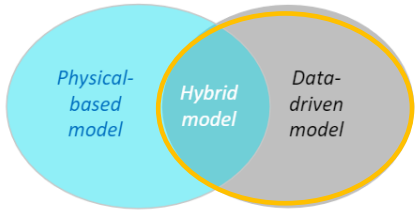
Simpler models: feed forward neural networks frameworks

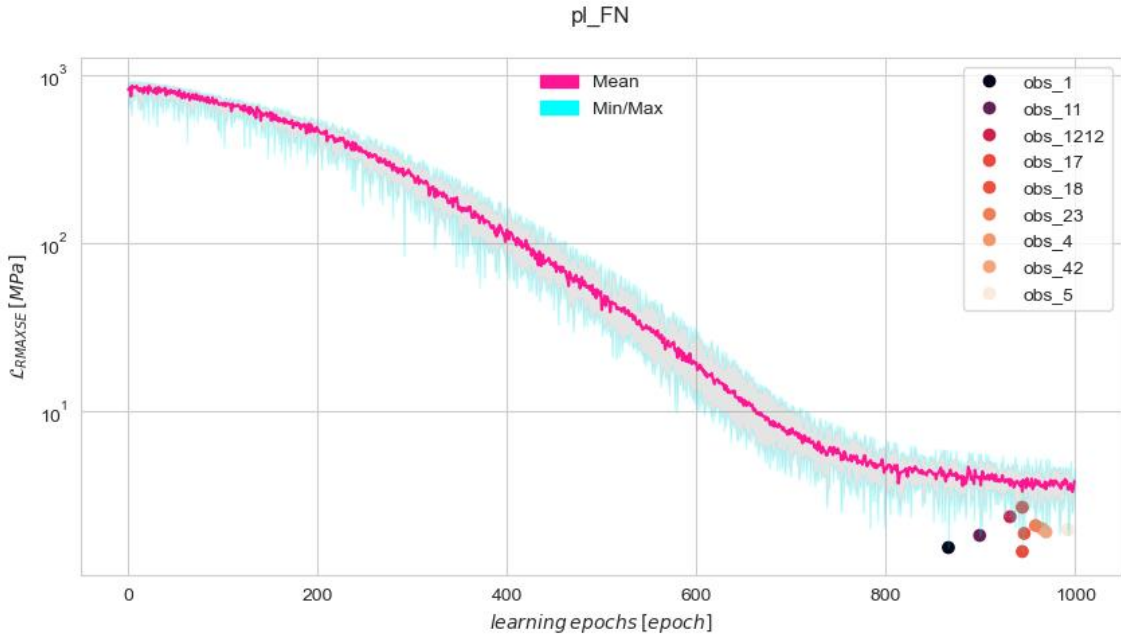


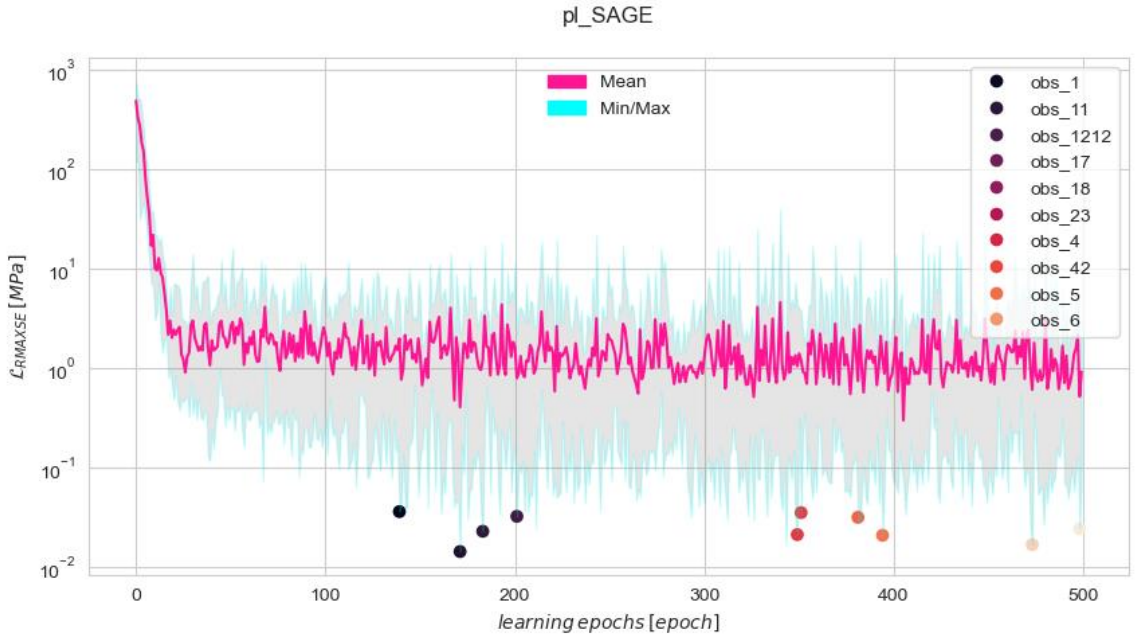
Graph neural networks models frameworks



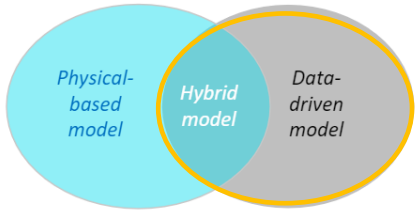
JAK MŮŽE VYPADAT TRÉNOVÁNÍ

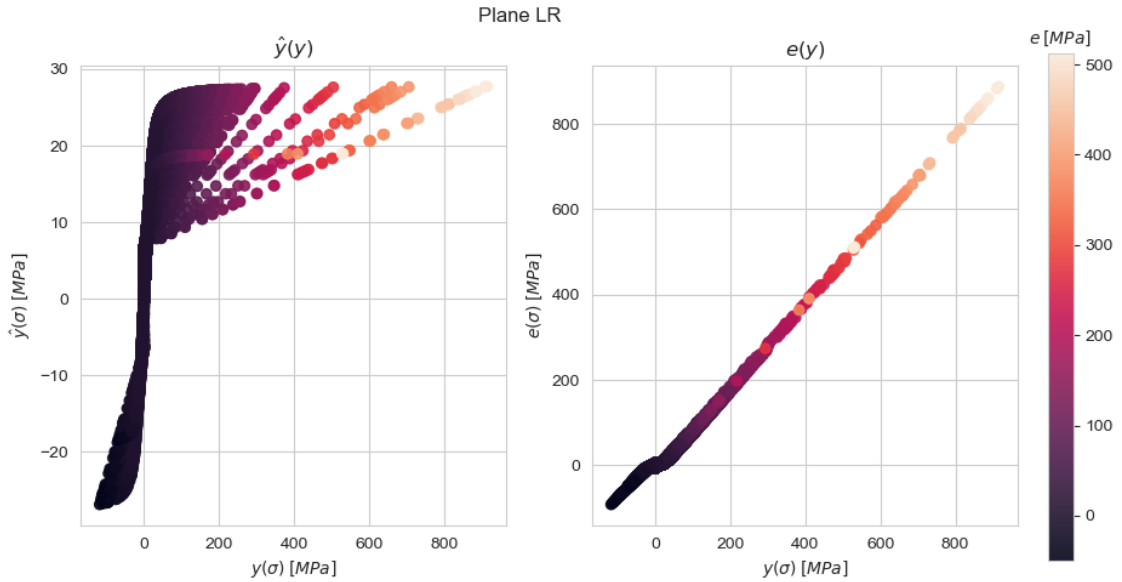


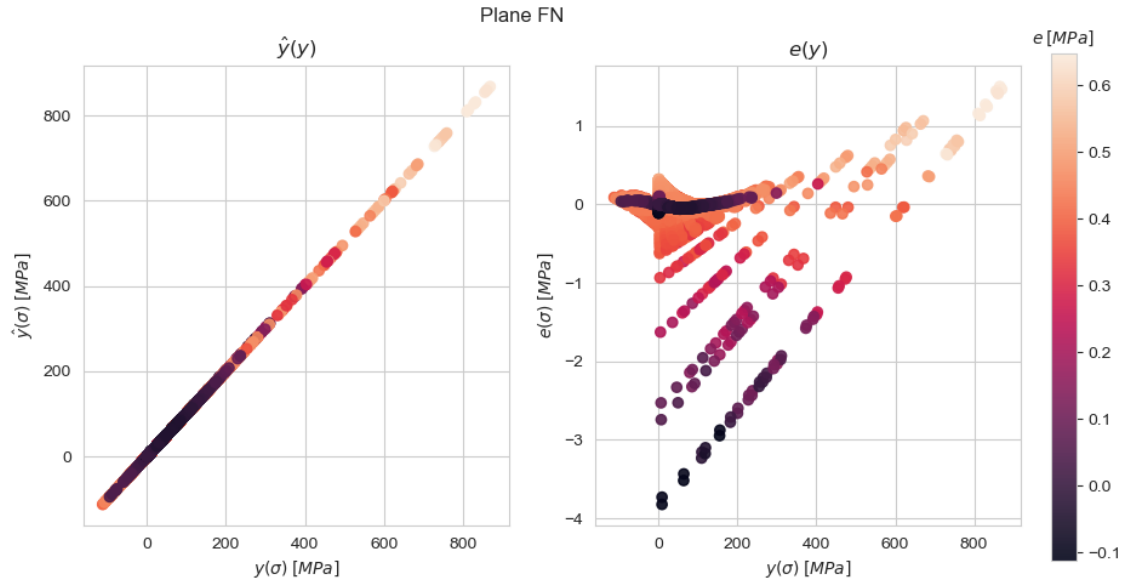




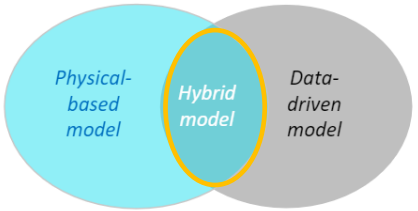
KAŽDÝ MODEL JE ŠPATNÝ, NĚKTERÝ JE UŽITEČNÝ



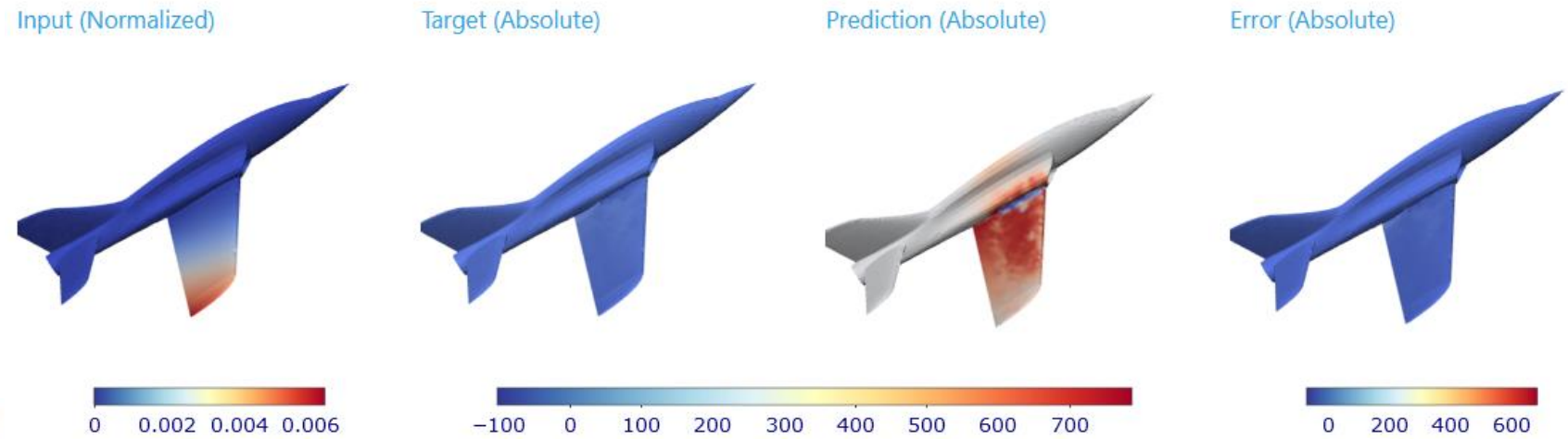




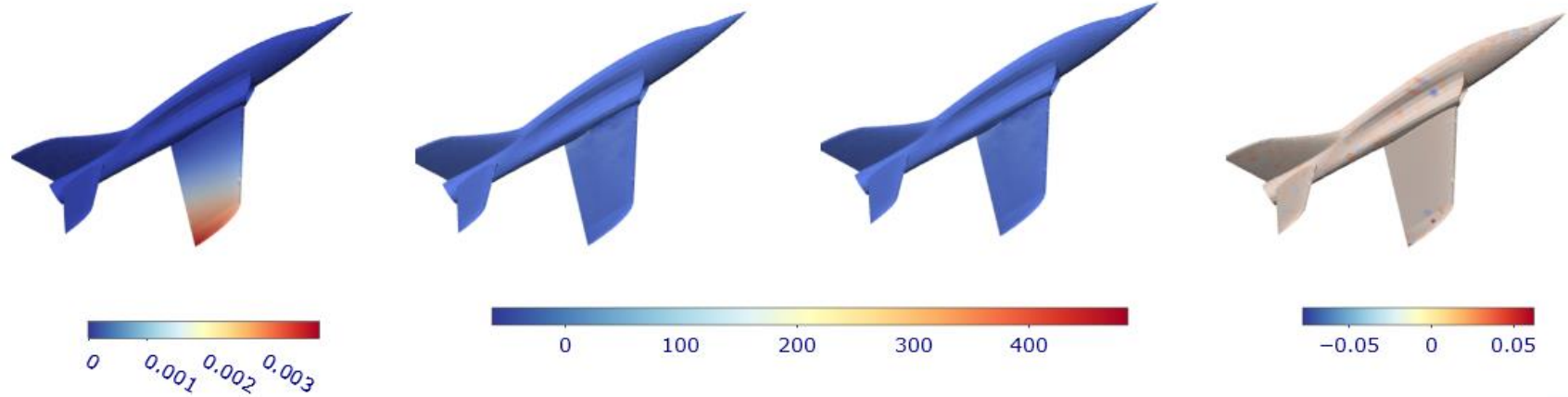
PREDIKCE MODELŮ



Multi input – output regressor



Framework established by graph convolutional layers



ZAVEREM

- Velmi rychlé intro do hybridního modelování
- Jaký typ fyzikálního modelu může být vhodný pro datovou akvizici
- Jak lze přenést znalosti fyzikálního modelu
- Případná výkonnost hybridního - datového modelu

REFERENCE

M. Ciklamini, "GF dataset: Mesh-Based Graphs Dataset for a Digital Twin of a Mechanical Systems," *2023 24th International Conference on Process Control (PC)*, Strbske Pleso, Slovakia, 2023, pp. 209-214, doi: 10.1109/PC58330.2023.10217603.

GF Dataset