*Supplementary Materials*

**Fault diagnosis Method for Aircraft EHA based on FCNN and MSPSO Hyperparameter Optimization**

**Table S1.** Model parameters of EHA-FPVS

|  |  |  |
| --- | --- | --- |
| **Parameters** | **Physical meaning of parameters** | **Value (units)** |
|  | input voltage | 270 |
|  | Armature winding resistance | 2.6 |
|  | Electrical conversion factor | 1/3 |
|  | armature winding Inductance | 1.3×10-3 |
|  | Electromotive force and torque coefficient | 0.23 |
|  | Total inertia of motor and hydraulic pump | 1.6×10-3 |
|  | Elastic modulus of hydraulic oil | 686 |
|  | Total damping coefficient of motor and hydraulic pump | 3×10-3 |
|  | Hydraulic piston pump displacement | 7.25 |
|  | Effective area on the high pressure chamber side of the actuator | 6.6×10-3 |
|  | Effective area on the low pressure chamber side of the actuator | 6.6×10-3 |
|  | Initial volume of the high pressure chamber side of the actuator | 1.176×10-4 |
|  | Initial volume of the low pressure chamber side of the actuator | 1.176×10-4 |
|  | Total mass of actuator and flight control rudder surface | 30 |
|  | Total damping factor of hydraulic cylinder | 100 |
|  | accumulator precharge pressure | 3 |
|  | Initial volume of gas in the accumulator | 0.5 |
|  | adiabatic exponent | 1.4 |
|  | pressure gradient of Safety valve  | 1 |
|  | oil leakage coefficient | 1×10-13 |
|  | Length of force arm | 0.05 |
|  | Equivalent spring coefficient | 1×106 |
|  | equivalent damping coefficient | 1×106 |