PCoE Datasets

Overview

The Prognostics Data Repository is a collection of data sets that have been donated by various universities, agencies, or companies. The data repository focuses exclusively on prognostic data sets, i.e., data sets that can be used for development of prognostic algorithms. Mostly these are time series of data from some nominal state to a failed state. The collection of data in this repository is an ongoing process.

Publications making use of databases obtained from this repository are requested to acknowledge both the assistance received by using this repository and the donators of the data. This will help others to obtain the same data sets and replicate your experiments. It also provides credit to the donators.

Users employ the data at their own risk. Neither NASA nor the donators of the data sets assume any liability for the use of the data or any system developed using the data.

If you have suggestions concerning the repository send email to chetan.s.kulkarni [at] nasa.gov Thank you and please come again.

Datasets

[Algae Raceway Data Set] [CFRP Composites Data Set] [Milling Data Set] [Bearing Data Set] [Battery Data Set] [Turbofan Engine Degradation Simulation Data Set] [PHM08 Challenge Data Set] [IGBT Accelerated Aging Data Set] [Trebuchet Data Set] [FEMTO Bearing Data Set] [Randomized Battery Usage Data Set] [Capacitor Electrical Stress Data Set] [MOSFET Thermal Overstress Aging Data Set] [Capacitor Electrical Stress Data Set - 2] [HIRF Battery Data Set] [Small Satellite Power Simulation Data Set] [Turbofan Engine Degradation Simulation Data Set-2]

1. **Algae Raceway Data Set**
   Publications using this data set

Description
Experiments were conducted on 3 small raceways in which spirulina was inoculated. The growth and, ultimately, decline of the algae biomass was recorded along with a number of environmental parameters. Experiments were conducted by the Exobiology group at NASA Ames.
Format
Datasets
+ **Download Algae Raceway Data Set** (8210 downloads)
Dataset Citation
Brad Bebout, Leslie Profert-Bebout, Erich Fleming, Angela Detweiler, and Kai Goebel "Algae Raceway Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

2. **CFRP Composites Data Set**
   Publications using this data set

Description
Run-to-failure experiments were run on CFRP panels with periodic measurements to capture internal damage growth under tension-tension fatigue. Monitoring data consist of lamb wave signals from a network of 16 piezoelectric (PZT) sensors and multiple triaxial strain gages. Additionally, periodic x-rays were taken to characterize internal damage as ground truth information. Three different layups were tested. Experiments were conducted at Stanford Structures and Composites Laboratory (SACL) in collaboration with the Prognostic Center of Excellence (PCoE) of NASA Ames Research Center.
Format
Dataset is organized into three zipped folders each containing data from coupons of single layup type and includes a readme file, and a folder with reports and papers published from this dataset.
Datasets
+ **Download CFRP Composites Data Set 1** (9705 downloads)   + **Download CFRP Composites Data Set 2** (4897 downloads)   + **Download CFRP Composites Data Set 3** (4924 downloads)
Dataset Citation
Abhinav Saxena, Kai Goebel, Cecilia C. Larrosa, and Fu-Kuo Chang "CFRP Composites Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

3. **Milling Data Set**
   Publications using this data set

Description
Experiments on a milling machine for different speeds, feeds, and depth of cut. Records the wear of the milling insert, VB. The data set was provided by the BEST lab at UC Berkeley.
Format
The set is in .mat format and has been zipped.
Datasets
+ **Download Milling Data Set** (16344 downloads)
Dataset Citation
A. Agogino and K. Goebel (2007). BEST lab, UC Berkeley. "Milling Data Set ", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

4. **Bearing Data Set**
   Publications using this data set

Description
Experiments on bearings. The data set was provided by the Center for Intelligent Maintenance Systems (IMS), University of Cincinnati.
Format
The set is in text format and has been rared, then zipped.

Datasets
+ Download Bearing Data Set (53995 downloads)
Dataset Citation
J. Lee, H. Qiu, G. Yu, J. Lin, and Rexnord Technical Services (2007). IMS, University of Cincinnati. "Bearing Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

5. **Battery Data Set**
   Publications using this data set

Description
Experiments on Li-Ion batteries. Charging and discharging at different temperatures. Records the impedance as the damage criterion. The data set was provided by the Prognostics CoE at NASA Ames.
Format
The set is in .mat format and has been zipped.
Datasets
+ Download Battery Data Set 1 (32745 downloads) **+ Download Battery Data Set 2** (16160 downloads) **+ Download Battery Data Set 3** (13159 downloads) **+ Download Battery Data Set 4** (10018 downloads) **+ Download Battery Data Set 5** (10725 downloads) **+ Download Battery Data Set 6** (11300 downloads)
Dataset Citation
B. Saha and K. Goebel (2007). "Battery Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

6. **Turbofan Engine Degradation Simulation Data Set**
   Publications using this data set

Description
Engine degradation simulation was carried out using C-MAPSS. Four different were sets simulated under different combinations of operational conditions and fault modes. Records several sensor channels to characterize fault evolution. The data set was provided by the Prognostics CoE at NASA Ames.
Format
The set is in text format and has been zipped including a readme file.
Datasets
+ Download Turbofan Engine Degradation Simulation Data Set (67276 downloads)
Dataset Citation
A. Saxena and K. Goebel (2008). "Turbofan Engine Degradation Simulation Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

7. **PHM08 Challenge Data Set**
   Publications using this data set

Description
Data from the data challenge competition held at the 1st international conference on Prognostics and Health Management (PHM08) is being made publicly available. The dataset is similar to the one posted above (see Turbofan engine degradation simulation data set) except the true RUL values are not revealed. Users are expected to develop their algorithms using training and test sets provided in the package. The data set was provided by the Prognostics CoE at NASA Ames. Evaluate your results on test data set using the link below. **Upload file for analysis** Note: - Results should be formatted as a column vector of RULs in a text file. - Evaluation is limited to only one trial per day.
Format
The set is in text format and has been zipped including a readme file.
Datasets
+ Download PHM08 Challenge Data Set (51197 downloads)
Dataset Citation
A. Saxena and K. Goebel (2008). "PHM08 Challenge Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

8. **IGBT Accelerated Aging Data Set**
   Publications using this data set

Description
Preliminary data from thermal overstress accelerated aging using the aging and characterization system. The data set contains aging data from 6 devices, one device aged with DC gate bias and the rest aged with a squared signal gate bias. Several variables are recorded and in some cases, high-speed measurements of gate voltage, collector-emitter voltage and collector current are available. The data set is provided by the Prognostics CoE at NASA Ames.
Format
The set is in Matlab and text format and has been compressed.
Datasets
+ Download IGBT Accelerated Aging Data Set (9387 downloads)
Dataset Citation
J. Celaya, Phil Wysocki, and K. Goebel (2009) "IGBT Accelerated Aging Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

9. **Trebuchet Data Set**
   Publications using this data set

Description
Trajectories of different types of balls launched from a trebuchet with varying counter weights. Flights were filmed and extraction routines calculated position of data. Both raw video data and extracted trajectories are provided. Geometry and physical properties of the trebuchet are available.

Format

Datasets
+ Download Trebuchet Data Set (7586 downloads)

Dataset Citation
B. Morton. Sentient Corporation. "Trebuchet Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

10. **FEMTO Bearing Data Set**
Publications using this data set

Description
Experiments on bearings' accelerated life tests provided by FEMTO-ST Institute, Besançon, France. More information can be found **here.**

Format

Datasets
+ Download FEMTO Bearing Data Set (18521 downloads)

Dataset Citation
"FEMTO Bearing Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

Publication Citation
P. Nectoux, R. Gouriveau, K. Medjaher, E. Ramasso, B. Morello, N. Zerhouni, C. Varnier. PRONOSTIA: An Experimental Platform for Bearings Accelerated Life Test. IEEE International Conference on Prognostics and Health Management, Denver, CO, USA, 2012

11. **Randomized Battery Usage Data Set**
Publications using this data set

Description
Batteries are continuously cycled with randomly generated current profiles. Reference charging and discharging cycles are also performed after a fixed interval of randomized usage in order to provide reference benchmarks for battery state of health.

Format

Datasets
+ Download Randomized Battery Usage Data Set 1 (8963 downloads) **+ Download Randomized Battery Usage Data Set 2** (5138 downloads) **+ Download Randomized Battery Usage Data Set 3** (4794 downloads) **+ Download Randomized Battery Usage Data Set 4** (8178 downloads) **+ Download Randomized Battery Usage Data Set 5** (4518 downloads) **+ Download Randomized Battery Usage Data Set 6** (4527 downloads) **+ Download Randomized Battery Usage Data Set 7** (4828 downloads)

Dataset Citation
B. Bole, C. Kulkarni, and M. Daigle "Randomized Battery Usage Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

Publication Citation
B. Bole, C. Kulkarni, and M. Daigle, 'Adaptation of an Electrochemistry-based Li-Ion Battery Model to Account for Deterioration Observed Under Randomized Use', Annual Conference of the Prognostics and Health Management Society, 2014

12. **Capacitor Electrical Stress Data Set**
Publications using this data set

Description
Capacitors were subjected to electrical stress under three voltage levels i.e 10V, 12V and 14V. Data Set contains EIS data as well as Charge/Discharge Signal data. DataSet Reference document can be downloaded **here**

Format

Datasets
+ Download Capacitor Electrical Stress Data Set 1 (4403 downloads) **+ Download Capacitor Electrical Stress Data Set 2** (2917 downloads) **+ Download Capacitor Electrical Stress Data Set 3** (2829 downloads)

Dataset Citation
J. Renwick, C. Kulkarni, and J Celaya "Capacitor Electrical Stress Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

Publication Citation
J. Renwick, C. Kulkarni and J. Celaya , "Analysis of Electrolytic Capacitor Degradation under Electrical Overstress for Prognostic Studies", in the Proceedings of the Annual Conference of the Prognostics and Health Management Society, Coronado CA, October 2015

13. **MOSFET Thermal Overstress Aging Data Set**
Publications using this data set

Description
Run-to-failure experiments on Power MOSFETs under thermal overstress. DataSet Reference document can be downloaded **here**

Format
The set is in .mat format and has been zipped.

Datasets
+ Download MOSFET Thermal Overstress Aging Data Set (4945 downloads)

Dataset Citation
J. R. Celaya, A. Saxena, S. Saha, and K. Goebel "MOSFET Thermal Overstress Aging Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

Publication Citation
J. R. Celaya, A. Saxena, S. Saha, and K. Goebel, "Prognostics of Power MOSFETs under Thermal Stress Accelerated Aging using Data-Driven and Model-Based Methodologies," in Annual Conference of the Prognostics and Health Management Society, (Montreal QC, Canada), September 2011.

14. **Capacitor Electrical Stress Data Set - 2**
Publications using this data set

Description
Capacitors were subjected to electrical stress at 10V. DataSet Reference document can be downloaded **here**
Format
The set is in .mat format and has been zipped.
Datasets
+ Download Capacitor Electrical Stress Data Set - 2 (3179 downloads)
Dataset Citation
J. Celaya, C. Kulkarni, G. Biswas, and K. Goebel "Capacitor Electrical Stress Data Set - 2", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA
Publication Citation
J. Celaya, C. Kulkarni, G. Biswas, and K. Goebel, "Towards A Model-based Prognostics Methodology for Electrolytic Capacitors: A Case Study Based on Electrical Overstress Accelerated Aging", International Journal of Prognostics and Health Management. 2012 Vol 3 (2) 004.

15. **HIRF Battery Data Set**
Publications using this data set

Description
Battery Data collected from the Experiments on the Edge 540 Aircraft in HIRF Chamber. Refernce document can be downloded **here**
Format
The set is in .mat format and has been zipped.
Datasets
+ Download HIRF Battery Data Set 1 (4233 downloads)   **+ Download HIRF Battery Data Set 2** (2634 downloads)   **+ Download HIRF Battery Data Set 3** (2535 downloads)   **+ Download HIRF Battery Data Set 4** (2516 downloads)   **+ Download HIRF Battery Data Set 5** (2533 downloads)   **+ Download HIRF Battery Data Set 6** (2688 downloads)
Dataset Citation
C. Kulkarni, E. Hogge, C. Quach and K. Goebel "HIRF Battery Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA
Publication Citation
Edward F. Hogge, Brian M. Bole, Sixto L. Vazquez, Jose Celaya,"Verification of a Remaining Flying Time Prediction System for Small Electric Aircraft", Annual Conference of the Prognostics and Health Management, PHM 2015

16. **Small Satellite Power Simulation Data Set**
Publications using this data set

Description
Data collected from the simulated experiments on small satellite BP930 batteries using the MACCOR system. Reference document can be dowloaded **here**. The power cycle reference sheet can be dowloaded **here**.
Format
The set is in .mat format and has been zipped.
Datasets
+ Download Small Satellite Power Simulation Data Set 1 (2562 downloads)   **+ Download Small Satellite Power Simulation Data Set 2** (1598 downloads)
Dataset Citation
C. Kulkarni and A. Guarneros "Small Satellite Power Simulation Data Set", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA
Publication Citation
Z.Cameron, C. Kulkarni, A. Guarneros, K. Goebel and S.Poll, "A Battery Certification Testbed for Small Satellite Missions" , IEEE AUTOTESTCON 2015, Nov 2-5, 2015, National Harbor, MA

17. **Turbofan Engine Degradation Simulation Data Set-2**
Publications using this data set

Description
The generation of data-driven prognostics models requires the availability of datasets with run-to-failure trajectories. In order to contribute to the development of these methods, the dataset provides a new realistic dataset of run-to-failure trajectories for a small fleet of aircraft engines under realistic flight conditions. The damage propagation modelling used for the generation of this synthetic dataset builds on the modeling strategy from previous work . The dataset was generated with the Commercial Modular Aero-Propulsion System Simulation (C-MAPSS) dynamical model. The data set is been provided by the Prognostics CoE at NASA Ames in collaboration with ETH Zurich and PARC. Readme file for the dataset describing the experimetal details and data can be found **here**.
Format
The dataset is in csv format and has been zipped. A python code to unzip the files can be found **here**.
Datasets
+ Download Turbofan Engine Degradation Simulation Data Set - 2 (722 downloads)
Dataset Citation
M. Chao, C.Kulkarni, K. Goebel and O. Fink (2021). "Aircraft Engine Run-to-Failure Dataset under real flight conditions", NASA Ames Prognostics Data Repository (http://ti.arc.nasa.gov/project/prognostic-data-repository), NASA Ames Research Center, Moffett Field, CA

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