Data and Codes for "Optimal Abort Policy for Mission-Critical Systems under Imperfect Condition Monitoring"

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The code used to reproduce the results in the paper is written in MATLAB. For any questions, please contact Jiawen Hu at hdl@sjtu.edu.cn.

The folder contains 13 subfolders (indicated in ***blue italic***), each of which includes the data, code, and results for a specific experiment.

Find optimal lambda
Phasetype_lambda.m is used to calculate the optimal λ with a given m_2, and draw Figure 2.

C-Policy-Weibull
Control_Chart_Policy.m is used to calculate the optimal cost per mission under ***C***-policy when T_{23} follows a Weibull distribution.

C-Policy-Weibull-mixture
Control_Chart_Policy.m is used to calculate the optimal cost per mission under ***C***-policy when T_{23} follows a mixture distribution.

M-Policy-Weibull
M_Policy.m is used to obtain the optimal probabilities for aborting mission at each decision epoch under ***M***-policy when T_{23} follows a Weibull distribution.
Simulation_M_Policy.m is used to calculate the optimal cost per mission under ***M***-policy when T_{23} follows a Weibull distribution.

M-Policy-Weibull mixture
M_Policy.m is used to obtain the optimal probabilities for aborting mission at each decision epoch under ***M***-policy when T_{23} follows a mixture distribution.
Simulation_M_Policy.m is used to calculate the optimal cost per mission under ***M***-policy when T_{23} follows a mixture distribution.

One-phase approximation-Weibull
One_Phase_Approximation.m is used to obtain the optimal radius for aborting mission at each decision epoch under one-phase approximation policy when T_{23} follows a Weibull distribution.
Simulation_One_Phase_Approximation.m is used to calculate the optimal cost per mission under one-phase approximation policy when T_{23} follows a Weibull distribution.

One-phase approximation-Weibull mixture
One_Phase_Approximation.m is used to obtain the optimal radius for aborting mission at each decision epoch under one-phase approximation policy when T_{23} follows a mixture distribution.
Simulation_One_Phase_Approximation.m is used to calculate the optimal cost per mission under one-phase approximation policy when T_{23} follows a mixture distribution.

Proposed modified PBVI-Weibull

Modified_PBVI.m is used to obtain the belief vectors at each decision epoch under proposed model when T_{23} follows a Weibull distribution.

Simulation_Modified_PBVI.m is used to calculate the optimal cost per mission under proposed model when T_{23} follows a Weibull distribution.

Proposed modified PBVI-Weibull mixture

Modified_PBVI.m is used to obtain the belief vectors at each decision epoch under proposed model when T_{23} follows a mixture distribution.

Simulation_Modified_PBVI.m is used to calculate the optimal cost per mission under proposed model when T_{23} follows a mixture distribution.

R-Policy-Weibull

RUL_Policy.m is used to calculate the optimal cost per mission under ***R***-policy when T_{23} follows a Weibull distribution.

R-Policy-Weibull mixture

RUL_Policy.m is used to calculate the optimal cost per mission under ***R***-policy when T_{23} follows a mixture distribution.

Section 9.3 Table 5

Classical_PBVI.m is used to calculate the time durations based on the classical PBVI algorithm.

Modified_PBVI.m is used to calculate the time durations based on the modified PBVI algorithm.

Multi-Task

Control_Chart_Policy_MT.m is used to calculate the optimal cost per mission under ***C***-Policy for a multi-task setting.

RUL_Policy_MT.m is used to calculate the optimal cost per mission under ***R***-Policy for a multi-task setting.

M_Policy_MT.m is used to obtain the optimal probabilities at each decision epoch under ***M***-Policy, and **Simulation_M_Policy_MT.m** is used to calculate the optimal cost per mission under ***M***-Policy for a multi-task setting.

One_Phase_Approximation_MT.m is used to obtain the optimal radius for aborting mission at each decision epoch, and **Simulation_One_Phase_Approximation_MT.m** is used to calculate the optimal cost per mission under One-phase approximation Policy for a multi-task setting.

Modified_PBVI_MT.m is used to obtain the belief point vector at each decision epoch under proposed modified_PBVI Policy, and **Simulation_Modified_PBVI_MT.m** is used to calculate the optimal cost per mission under our proposed modified PBVI for a multi-task setting.