

# Attachments

## Important Matlab evaluation scripts

### Collecting stress drops

```
1 function [dropsAll dropsT dropsTs dropsS]=LDE(Time,EngStress)
2 % load drops evaluation
3
4 dropTresh=0.001;
5
6 count=0;
7 dropStress=0;
8 dropTime=0;
9
10 x=EngStress;
11
12 j=0;
13 k=0;
14
15 lngth=length(x);
16
17 for i=1:lngth-1 % finds load drops
18
19     if x(i)>x(i+1)
20         dropStress=dropStress+x(i)-x(i+1);
21         count=count+1; % increases size
22         dropTime=dropTime+Time(i);
23
24         if k==0
25             TimeStart=Time(i);
26         end;
27
28         k=1;
29
30     else % if the drop is ended
31         if count>0
32             j=j+1;
33             dropsS(j)=dropStress;
34             dropsT(j)=dropTime/count;
35             dropsTs(j)=TimeStart;
36             k=0;
37         end;
38         count=0;
```

```

39         dropStress=0;
40         dropTime=0;
41     end
42
43     if i==length-1 && count>0 % saves the last drop
44         j=j+1;
45         dropsS(j)=dropStress;
46         dropsT(j)=dropTime/count; % time "in the middle" of
           the drop
47         dropsTs(j)=TimeStart; % time when the drop starts
48         count=0;
49     end;
50 end
51
52 dropsS=dropsS';
53 dropsT=dropsT';
54 dropsTs=dropsTs';
55
56 dropVec=dropsS; % saves also filtered-out drops
57
58 if exist('dropTresh','var')
59     ind=find(dropsS>dropTresh);
60     dropsS=dropsS(ind);
61     dropsT=dropsT(ind);
62     dropsTs=dropsTs(ind);
63 end;
64
65 dropsAll=dropVec;
66
67 end
68
69 % Michal Knapek 01/2016

```

## AE events merging

```

1 function [MevTime MevC1 MevDur MevAmpl count timeDifference] =
           mergeEv(evTimeSec, evC1, evDur, evAmpl);
2 % Merges neighboring events within a defined interval (limit)
3
4 limit = 0.1; % seconds
5
6 cnt=0;
7 timeDiff=0;
8 count=[0 0];
9 timeDifference=[0 0];

```

```

10
11 for i=1:length(evTimeSec)
12
13     if i==1
14         MevTime(i)=evTimeSec(i);
15         MevC1(i)=evC1(i);
16         MevDur(i)=evDur(i);
17         MevAmpl(i)=evAmpl(i);
18     else
19
20         if (evTimeSec(i)-evTimeSec(i-1))<limit
21
22             MevTime(i)=evTimeSec(i);
23             MevC1(i)=MevC1(i-1)+evC1(i);
24             MevDur(i)=MevDur(i-1)+evDur(i);
25             MevAmpl(i)=MevAmpl(i-1)+evAmpl(i);
26
27             cnt=cnt+1;
28             count(i)=count(i-1)+cnt;
29
30             timeDiff=evTimeSec(i)-evTimeSec(i-1);
31             timeDifference(i)=timeDifference(i-1)+timeDiff;
32
33             MevTime(i-1)=NaN; % if merging occurs,
34             MevC1(i-1)=NaN; % former event is marked and ==>
35             MevDur(i-1)=NaN;
36             MevAmpl(i-1)=NaN;
37             count(i-1)=NaN;
38             timeDifference(i-1)=NaN;
39         else
40             MevTime(i)=evTimeSec(i);
41             MevC1(i)=evC1(i);
42             MevDur(i)=evDur(i);
43             MevAmpl(i)=evAmpl(i);
44
45             cnt=0;
46             count(i)=cnt;
47
48             timeDiff=0;
49             timeDifference(i)=timeDiff;
50         end;
51     end;
52 end;
53
54 MevTime(isnan(MevTime))=[]; % ==> ... deleted.

```

```

55 MevC1(isnan(MevC1)) = [];
56 MevDur(isnan(MevDur)) = [];
57 MevAmpl(isnan(MevAmpl)) = [];
58 count(isnan(count)) = [];
59 timeDifference(isnan(timeDifference)) = [];
60
61 MevTime=MevTime';
62 MevC1=MevC1';
63 MevDur=MevDur';
64 MevAmpl=MevAmpl';
65 count=count';
66 timeDifference=timeDifference';
67
68 end
69
70 % Michal Knapek 02/2016

```

## Assigning the stress drops to the AE events

```

1 function [dropTimeOut, dropStressOut] = LDEfind(MevTime, ...
2 dropTime, dropStress, timeDifference)
3
4 interval = 0.15; % must be >= "limit" in the mergeEv function
5 % countFilter = 1;
6 % evTime=evTime(evTime>countFilter);
7
8 evTime=MevTime;
9
10 dropTimeOut=zeros(1, length(evTime)); % preallocation
11 dropStressOut=zeros(1, length(evTime));
12
13 for i=1:length(evTime)
14     pom = find(dropTime < (evTime(i)+interval) & ...
15             dropTime > (evTime(i)-interval-timeDifference(i)));
16
17     x=dropTime(pom);
18     y=dropStress(pom);
19
20     if isempty(x)
21         x=0;
22         y=0;
23     else
24         x=mean(x)-timeDifference(i);
25         y=sum(y);
26     end;

```

```
27
28     dropTimeOut(i)=x;
29     dropStressOut(i)=y;
30 end;
31
32 dropTimeOut=dropTimeOut';
33 dropStressOut=dropStressOut';
34
35 % dropStressOut(dropStressOut==0)=[];
36 % dropTimeOut(dropTimeOut==0)=[];
37
38 end
39
40 % Michal Knapek 01/2016
```