smFRET data Analysis Code

**Time correlation function (TCF)**

**TCF Second Order MATLAB Code:**

```
InputFileID = fopen('2ndorder.txt','r');
allData= importdata('2ndorder.txt');
fclose(InputFileID);
OutputFileID = fopen('Out_2ndorder.txt','w');
timeList = allData(:,1);
fretEff = allData(:,2);
DeltaTau1 = input('\n Enter the value of delta Tau1 : ');
timeInterval = timeList(2)-timeList(1);
meanFret = mean(fretEff);
deltaFret = fretEff-meanFret;
fprintf(OutputFileID,'This data is produced for delta Tau-1= %0.3f \n\n', DeltaTau1);
fprintf(OutputFileID,'Tau-1   Total C2    Avg C2   deltatotC2  deltaAvgC2\n');
stopSwitch1 = 0;
Tau1=0;
while(stopSwitch1==0)
jump1 = int16(Tau1/timeInterval);
rowNo=1;
CorrelVal=0;
deltaCorrelVal=0;
termCount=0;
deltaTermCount=0;
while(rowNo+jump1<=size(fretEff,1))
term = fretEff(rowNo)*fretEff(rowNo+jump1);
deltaTerm = deltaFret(rowNo)*deltaFret(rowNo+jump1);
CorrelVal= CorrelVal+term;
deltaCorrelVal= deltaCorrelVal+deltaTerm;
termCount=termCount+1;
deltaTermCount=deltaTermCount+1;
rowNo=rowNo+1;
end
if termCount==0
stopSwitch1=1;
break;
else
AvgCorrelVal = CorrelVal/termCount;
deltaAvgCorrelVal = deltaCorrelVal/deltaTermCount;
```

**TCF fourth Order MATLAB Code:**

```
InputFileID = fopen('Mol1.txt','r');
allData= importdata('Mol1.txt');
fclose(InputFileID);
OutputFileID = fopen('trial.txt','w');
timeList = allData(:,1);
fretEff = allData(:,2);
Tau2 = input('\n Enter the value of Tau-2 : ');
Tau3 = input('\n Enter the value of Tau-3 : ');
```

```
timeInterval = timeList(2)-timeList(1);
DeltaTau1 = timeInterval;
meanFret = mean(fretEff);
deltaFret = fretEff-meanFret;
if (rem(Tau2,timeInterval)~=0)
disp('This Tau-2 value is not compatible with your data set')
return;
end
if (rem(Tau3,timeInterval)~=0)
disp('This Tau-3 value is not compatible with your data set')
return;
end
jump2 = int16(Tau2/timeInterval);
jump3 = int16(Tau3/timeInterval);
fprintf(OutputFileID,'This data is produced for Tau-2= %0.3f and Tau-3= %0.3f \n\n', Tau2,
Tau3);
fprintf(OutputFileID,'Tau-1   Total C4    Avg C4   deltatotC4  deltaAvgC4\n');
stopSwitch1 = 0;
Tau1=0;
while(stopSwitch1==0)
jump1 = int16(Tau1/timeInterval);
rowNo=1;
CorrelVal=0;
deltaCorrelVal=0;
termCount=0;
deltaTermCount=0;
while(rowNo+jump1+jump2+jump3<=size(fretEff,1))
term                                                                                                =
fretEff(rowNo)*fretEff(rowNo+jump1)*fretEff(rowNo+jump1+jump2)*fretEff(rowNo+jump1+ju
mp2+jump3);
deltaTerm                                                                                           =
deltaFret(rowNo)*deltaFret(rowNo+jump1)*deltaFret(rowNo+jump1+jump2)*deltaFret(rowNo
+jump1+jump2+jump3);
CorrelVal= CorrelVal+term;
deltaCorrelVal= deltaCorrelVal+deltaTerm;
termCount=termCount+1;
deltaTermCount=deltaTermCount+1;
rowNo=rowNo+1;
end
if termCount==0
stopSwitch1=1;
break;
else
AvgCorrelVal = CorrelVal/termCount;
deltaAvgCorrelVal = deltaCorrelVal/deltaTermCount;
```

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