# Exemplars List for Contextualized Failure Characterization

Facts

* Exemplars are categorized by Deviation Direction: x, y, or Yall. The total number of exemplars has been diminished compared to our initial FC approach. And FzRotAvgMag has been changed to FzRotAvgAmp.
  + xDir Deviation: MyRotAvgMag = MyR
  + yDir Deviation: MzRotAvgAmp = MzR
  + YallDir Deviation: FzAppAvgMag= FzA
* These exemplars are now subdividied by deviation subgroups. There are a total of 3 deviation subgroups:
  + For xDirDeviations: There is only 1 deviation direction subgroup:{x, or y, or Yall}.
  + For yDirDeviations: There are 2 deviation directions subgroups: {xy, xYall, yYall}.
  + For yDirDeviations: There is 1 deviation direction subgroup: {xyYall}.
* Exemplars will now also consider upper and lower bounds:
  + MyRotAvgAmp1 = MyR
  + MyRotAvgAmp1\_Count = MyRC
  + MyRotAvgAmp1\_Mean = MyRM
  + MyRotAvgAmp1\_UpperBound = MyRU
  + MyRotAvgAmp2\_LowerBound = MyRL  
      
    These in turn can be created for successful and failed versions.
* After some statistical analysis, we have also chosen to assign exemplars to trials in which there is only 1 active deviation direction, or to trials in which there are 2 active deviation directions, or even 3. That is, we believe that since the statistical variance of an exemplar does not vary much independently of whether we use 1, 2, or 3 deviations, we can only use one exemplar to characterize the deviation despite how many deviation directions are being used. Other times however, the variance of one exemplar varies in a statistically significant way when there are 2 deviation directions applied to the task. For this reason, we sub-divide one exemplar into two. One for deviations that only occur in 1 direction and another one for deviations that occur in 2 directions. Same is the case for three deviations.

So, in total, we will have 6 sub-exemplars for deviations in the x-, y-, and Yall-directions.

* xDir-Devation
  + [sMyR,sMyRU,sMyRL ]and [fMyR,fMyRU,fMyRL]
* yDir-Deviation  
  + MzRotAvgAmp1 = MzR1, MzR1U,MzR1L
  + MzRotAvgAmp23 = MzR23, MzR23U, MzR23L  
      
    Total # 12  
    [sMzR1,sMzR1U,sMzR1L and fMzR1,fMzR1U,fMzR1L]  
    [sMzR23,sMzR23U,sMzR23L and fMzR23,fMzR23U,fMzR23L]
  + FzAppAvgAmp1 = FzA1
  + FzAppAvgAmp1\_UpperBound=FzA1U
  + FzAppAvgAmp1\_LowerBound=FzA1L
  + FzAppAvgAmp1 = FzA2
  + FzAppAvgAmp1\_UpperBound=FzA2U
  + FzAppAvgAmp1\_LowerBound=FzA2L
  + FzAppAvgAmp1 = FzA2
  + FzAppAvgAmp1\_UpperBound=FzA2U
  + FzAppAvgAmp1\_LowerBound=FzA2L
* A single structure will be created to hold all exemplar variables including success and failure cases. In the table below, we show a representation for the for FzA. FzA is sub-divided into 3 exemplar parts to capture data in 1, 2, or 3 deviations.

|  |  |
| --- | --- |
| Success | Failure |
| sFzA1C | fFzA1C |
| sFzA1M | fFzA1M |
| sFzA1U | fFzA1U |
| sFzA1L | fFzA1L |
| sFzA2C | fFzA2C |
| sFzA2M | fFzA2M |
| sFzA2U | fFzA2U |
| sFzA2L | fFzA2L |
| sFzA3C | fFzA3C |
| sFzA3M | fFzA3M |
| sFzA3U | fFzA3U |
| sFzA3L | fFzA3L |