Note: F.M is matrix multiplication of F times Matrix

F.FT is F times transpose of F

This is an analysis of an.intergrated.INS.GPS.kalman.v2.m

=============== **Analysis of code that handles time events with GPS signal and w/o GPS Signal**====================

F<- init as State Transition Matrix size:8x8

Q<----input data an.intergrated.INS.GPS.kalman.v2.m size:8x8 Constant in loop

P <--- Initial Error Covariance Matrix size:8x8

w<-process noise vector size:8x 'number of samples ' (constant)

process\_noise<-sqrt(Q)\*w;

v<-Measurement noise vector (constant)

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| |

R\_1<- measurement error cov with GPS signal.(Constant) R\_0<- error cov w/o GPS signal. (Constant)

sensor\_noise\_1<-sqrt(R\_1).v With GPS signa (Constant) sensor\_noise\_0<-sqrt(R\_0).v Without GPS signal (Constant)

| |

----------------------------------------------------------------Start of LOOP-------------------------------------------------------------

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Start of 'Is there GPS Signal?'

**\_\_\_\_\_\_\_\_\_\_\_\_\_Yes GPS Signal\_\_\_\_\_\_\_\_\_ \_\_|\_\_\_ \_\_\_\_\_\_\_\_\_\_No GPS Signal\_\_\_\_\_**

| **|** | |

**-- measurement equations-- -- system equations -- -- measurement equations-- -- system equations --**

| | | |

xV<-F.xV+process\_noise | xV<-F.xV+process\_noise |

| H<-Init 8x8 | H<-Init 2x8

| R<-Init size:4 | R<-Init size:2

| | | |

z\_gps<- with xV,sensor\_noise\_1 | z\_vel<-with sensor\_noise\_0,xV,H |

| K<-P.HT.inv(H.P.HT+R) | K<-P.HT.inv(H.P.HT+R)

| | | |

| (Compute Error Covariance for Updated Estimate) (Compute Error Covariance for Updated Estimate)

| P1<-(((I - K.H).P)+((I - K.H).P)T)/2 P1<-(((I - K.H).P)+((I - K.H).P)T)/2

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| |

xV<-xV+K.(z\_gps-H.xV) xV<-xV+K.(z\_vel-H.xV)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_End of 'Is there GPS Signal?'\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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|

P<-((F.P1.FT+ Q)+(F.P1.FT+ Q)T

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----------------------------------------------------------------End of LOOP-------------------------------------------------------------

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functions for generating graphs