**FanCtl\_Spd**

## 1.基本信息

### 1.1.目的

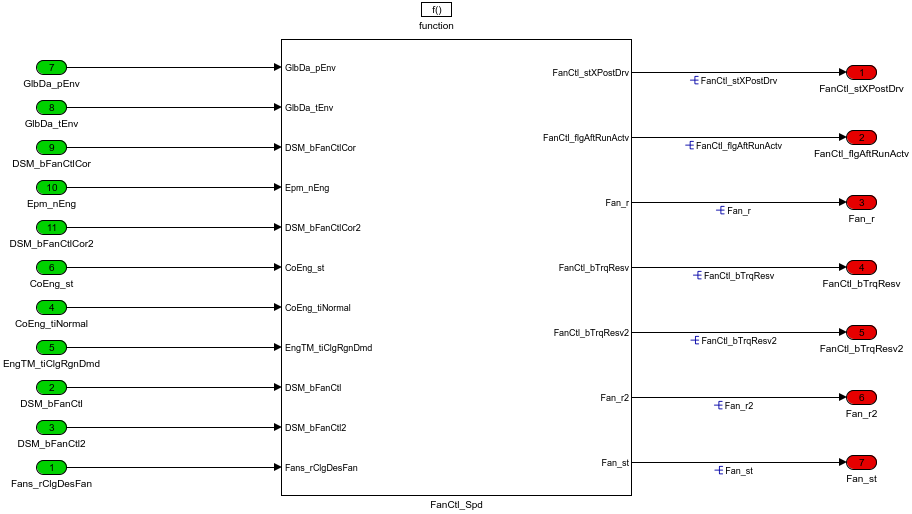
根据发动机状态、环境温度、环境压力产生的冷却性能信号输出到设备封装（DE）模块。

### 1.2.参考

FanCtl\_Spd；Fans\_ClgDem ；Fans\_trq；Fan\_DD；Fan\_VD；FanSpd\_DD；FanSpd\_VD。

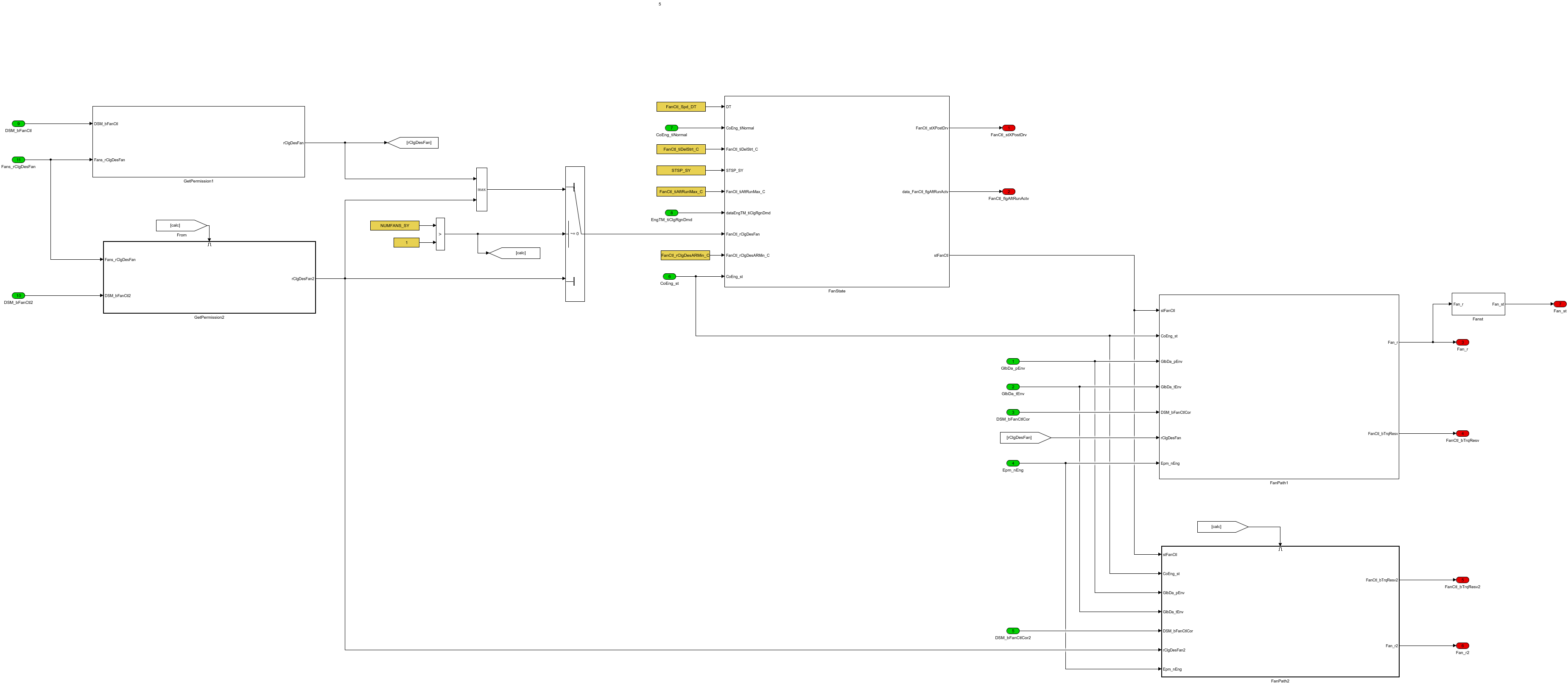
## 2.功能描述

### 2.1.Top level overview



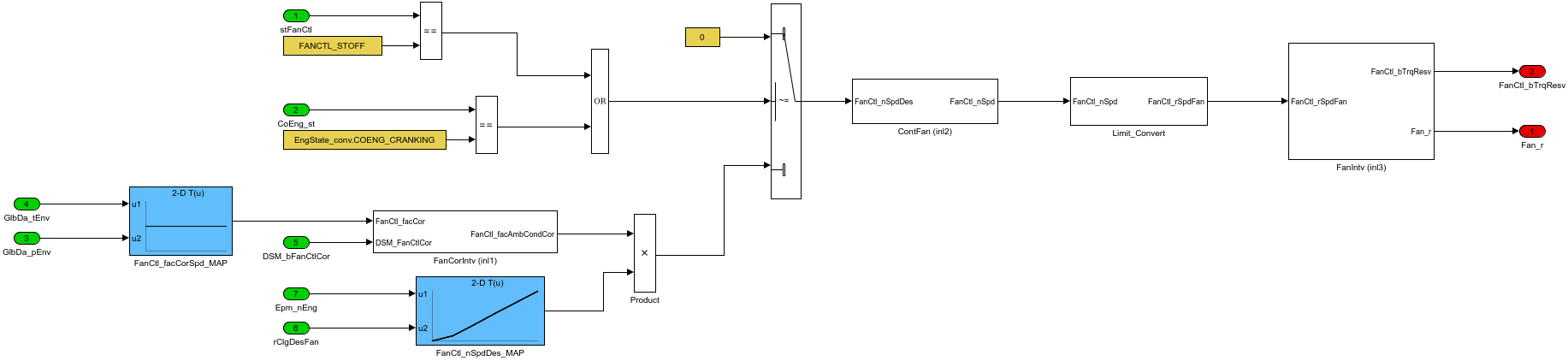
根据发动机状态、环境等信号输出风扇开度和风扇运行状态信号。

#### 2.1.1.FanCtl\_Spd



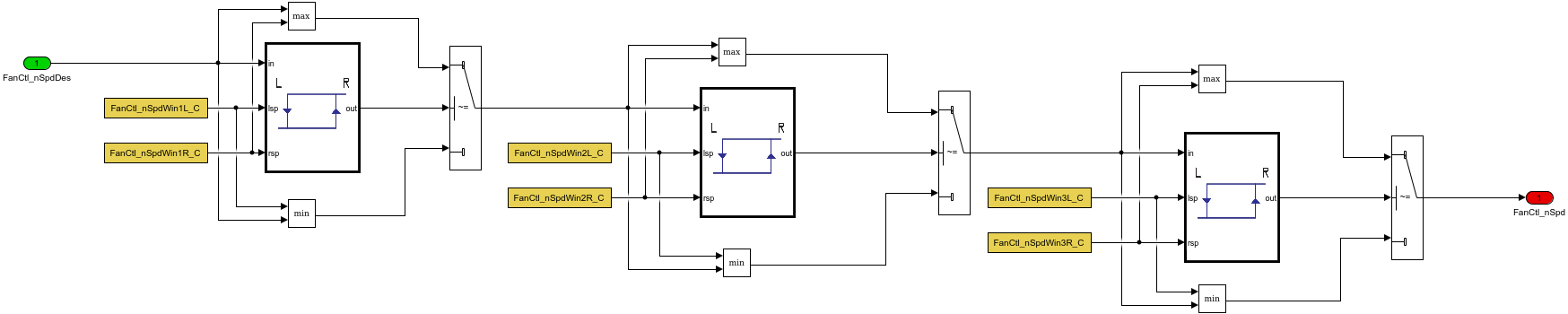
NUMFANS\_SY>1，两路风扇作用，NUMFANS\_SY=1，一路风扇作用。

##### 2.1.1.1.FanPath1



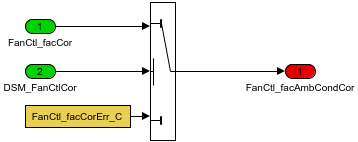
冷却风扇通道1逻辑，得到冷却风扇开度百分比需求和风扇起动过程信号。

###### 2.1.1.1.1.ContFan (inl2)



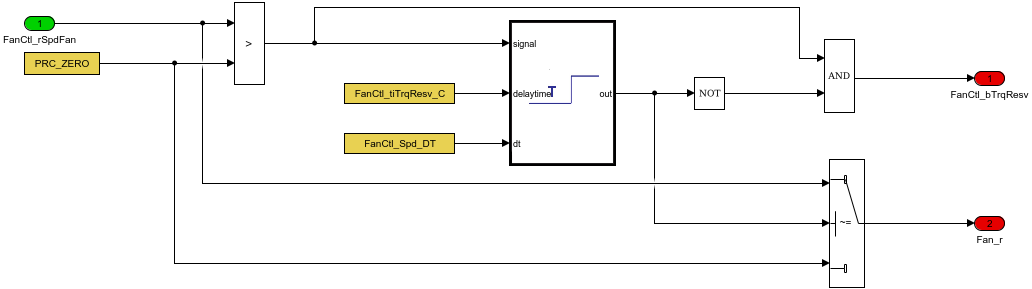
转速迟滞滤波处理。

###### 2.1.1.1.2.FanCorIntv (inl1)



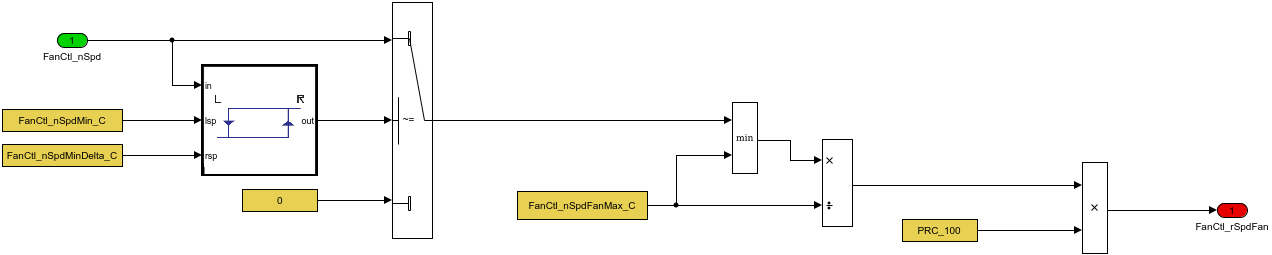
没有故障时风扇转速系数传递。

###### 2.1.1.1.3.FanIntv (inl3)



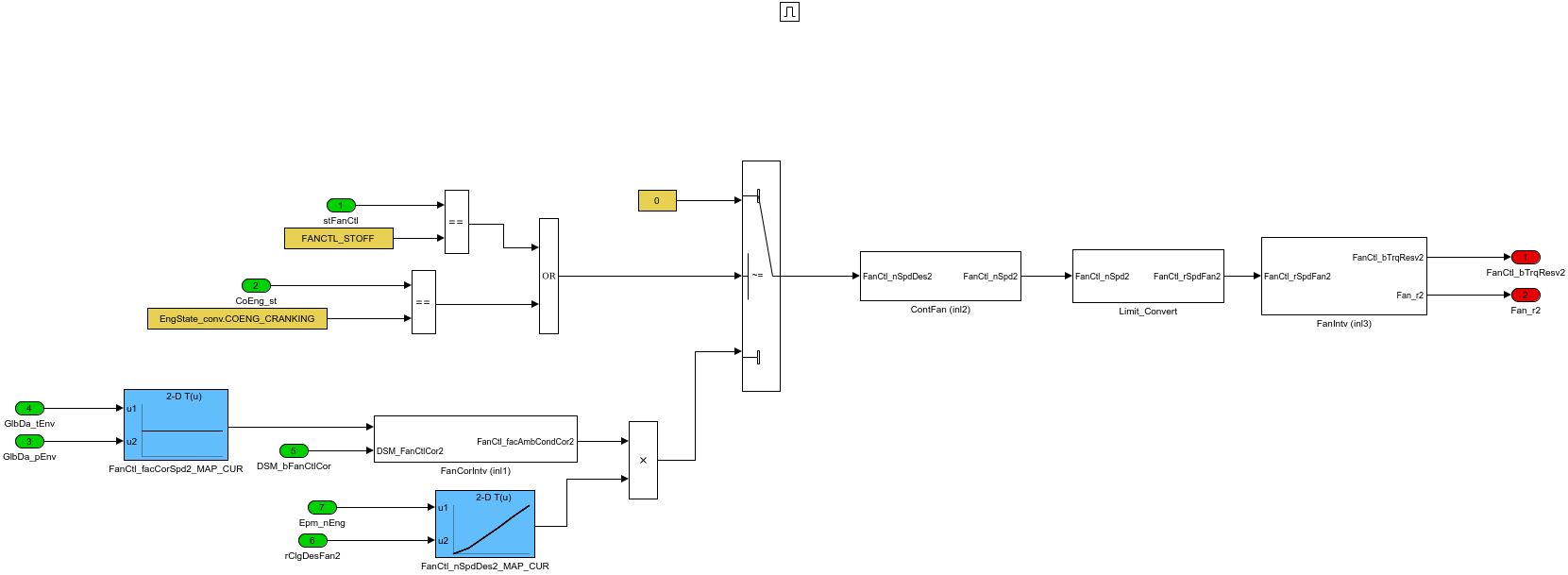
利用延迟滤波模块得到风扇起动时的信号和风扇开度信号。

###### 2.1.1.1.4.Limit\_Convert



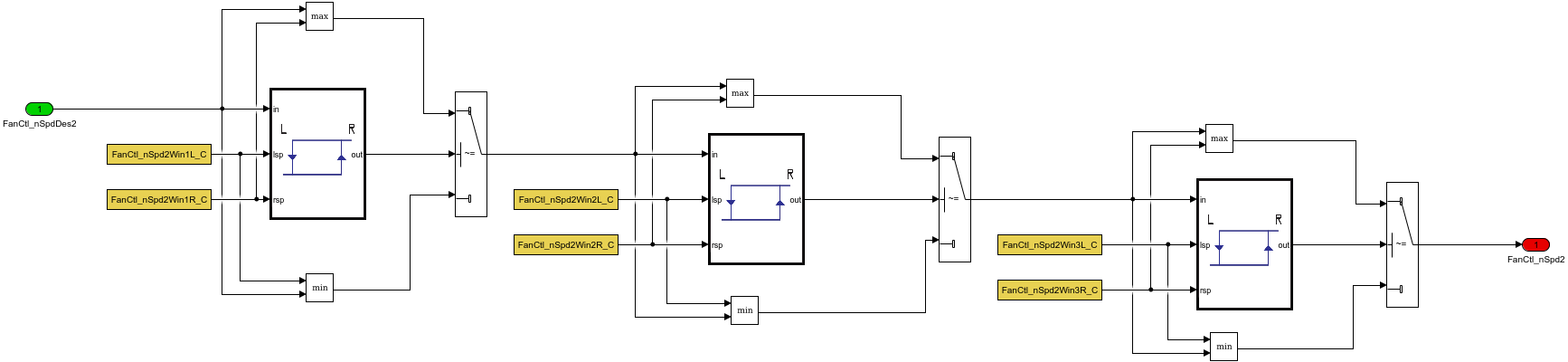
利用风扇转速和最大转速比值，得到风扇转速百分比信号。

##### 2.1.1.2.FanPath2



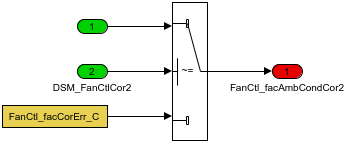
冷却风扇通道2逻辑，得到冷却风扇开度百分比需求和风扇起动过程信号。

###### 2.1.1.2.1.ContFan (inl2)



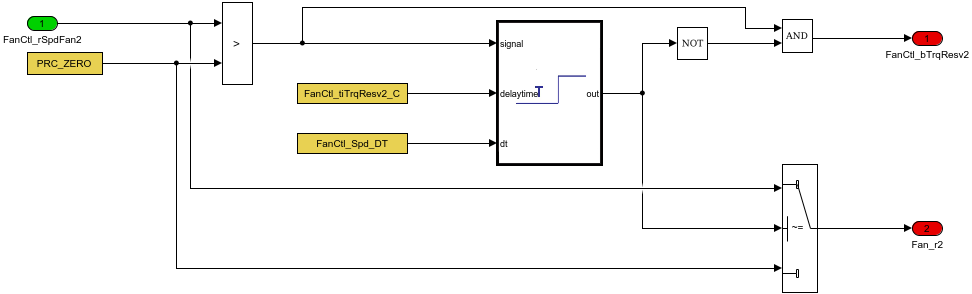
转速迟滞滤波处理。

###### 2.1.1.2.2.FanCorIntv (inl1)



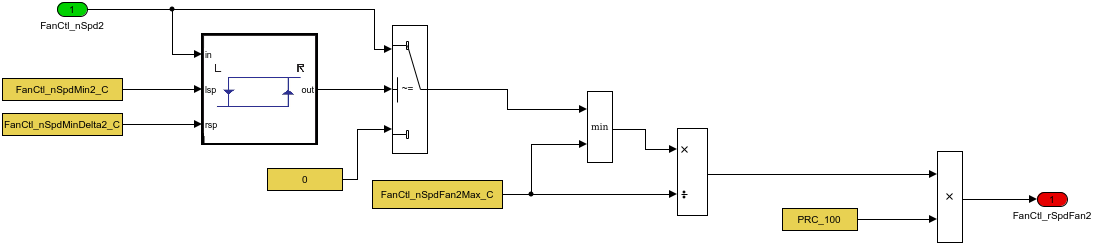
没有故障时系数传递。

###### 2.1.1.2.3.FanIntv (inl3)



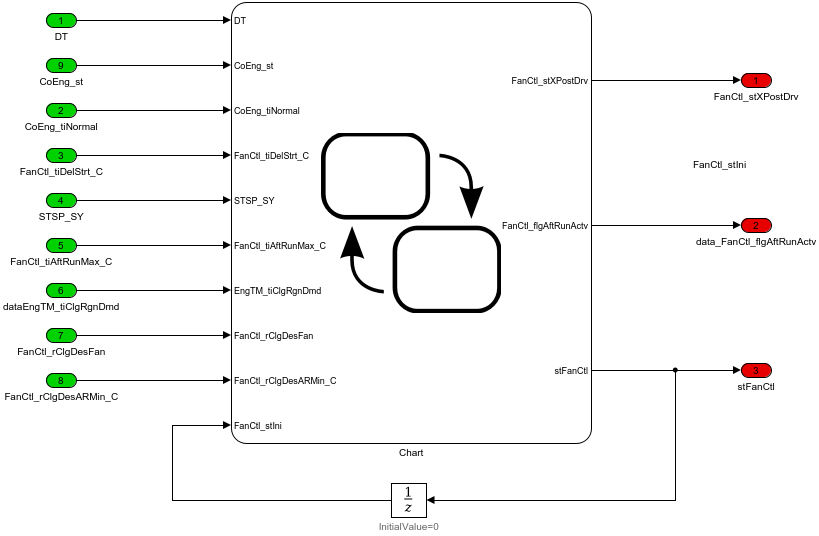
利用延迟滤波模块得到风扇起动时的信号和风扇开度信号。

###### 2.1.1.2.4.Limit\_Convert



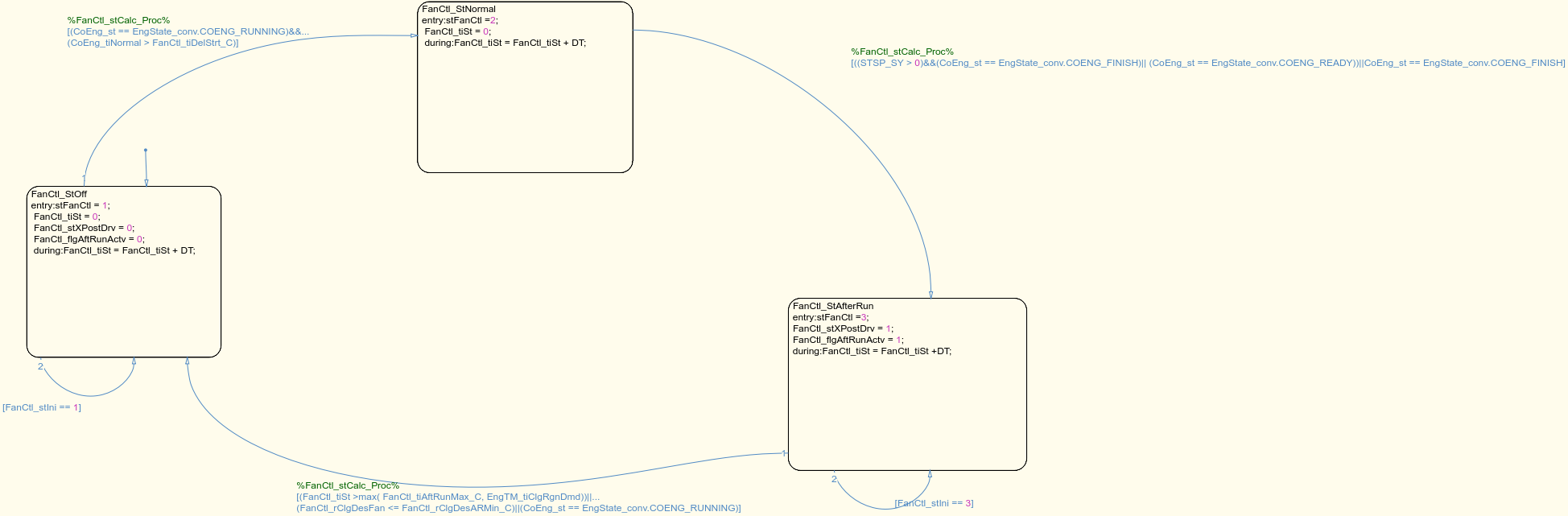
利用风扇转速和最大转速比值，得到风扇转速百分比信号。

##### 2.1.1.3.FanState



风扇状态转换。

###### 2.1.1.3.1.Chart



冷却风扇关闭-正常运行-后运行三种状态，循环具有单向性。

(1)风扇关闭-正常运行

发动机运行时间CoEng\_tiNormal大于阈值，发动机处于运行模式。

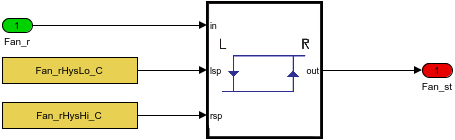
(2) 正常运行-后运行

启停功能STSP\_SY>0,发动机运行状态决定风扇状态切换，状态机优先级()>&&>||。

(3) 后运行-风扇关闭

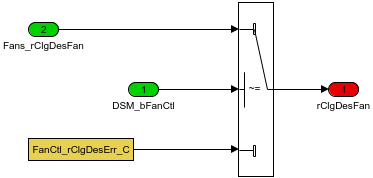
切换条件包括运行时间大于FanCtl\_tiAftRunMax\_C和EngTM\_tiClgRgnDmd的最大值；中间变量风扇开度小于FanCtl\_rClgDesARMin\_C；发动机运行状态。

##### 2.1.1.4.Fanst



风扇开度大于或小于定值得到风扇开度状态。

##### 2.1.1.5.GetPermission1



##### 2.1.1.6.GetPermission2

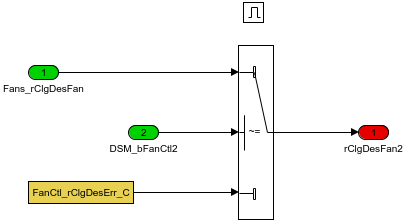


Table. 输入信号

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Min | Max | Width | Description | Object Class | Typedef | Unit |
| Fans\_rClgDesFan | -300.0 | 300.0 | -1.0 | Relative cooling performance demand to fan |  | Prc\_100\_rate | % |
| DSM\_bFanCtl | 0.0 | 1.0 | -1.0 |  |  | Dsm |  |
| DSM\_bFanCtl2 | 0.0 | 1.0 | -1.0 |  |  | Dsm |  |
| CoEng\_tiNormal | 0.0 | 42949672950.0 | -1.0 | Time since state"CONENG\_RUNNING"was reached |  | EngTime\_ms | ms |
| EngTM\_tiClgRgnDmd | 0.0 | 42949672950.0 | -1.0 | Duration to keep fan On to cool the DPF and surrounding |  | EngTime\_ms | ms |
| CoEng\_st |  |  | -1.0 | Engine coordinator state |  | Enum:EngState\_conv |  |
| GlbDa\_pEnv | -3000.0 | 3000.0 | -1.0 | environmental pressure |  | AirPressure\_kPa | kPa |
| GlbDa\_tEnv | -50.0 | 150.0 | -1.0 | environment temperature |  | Temp\_deg | deg |
| DSM\_bFanCtlCor | 0.0 | 1.0 | -1.0 |  |  | Dsm |  |
| Epm\_nEng | 0.0 | 6000.0 | -1.0 | Engine speed |  | EngSpeed\_rpm | rpm |
| DSM\_bFanCtlCor2 | 0.0 | 1.0 | -1.0 |  |  | Dsm |  |

Table. 输出信号

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Min | Max | Width | Description | Object Class | Typedef | DefaultValue | Unit |
| FanCtl\_stXPostDrv | 0.0 | 1.0 | -1.0 | Prolonging post drive due to fan |  | boolean | 0.0 |  |
| FanCtl\_flgAftRunActv | 0.0 | 1.0 | -1.0 | fan afterrun active |  | boolean | 0.0 |  |
| Fan\_r | 0.0 | 100.0 | -1.0 | Actuator setpoint value for the first fan output |  | DutyCycle\_rate | 0.0 | % |
| FanCtl\_bTrqResv | 0.0 | 1.0 | -1.0 | the additional torque required for Fan1 from the engine |  | boolean | 0.0 |  |
| FanCtl\_bTrqResv2 | 0.0 | 1.0 | -1.0 | the additional torque required for Fan2 from the engine |  | boolean | 0.0 |  |
| Fan\_r2 | 0.0 | 100.0 | -1.0 | set point duty cycle for PWM fan power stage 2 |  | DutyCycle\_rate | 0.0 | % |
| Fan\_st | 0.0 | 1.0 | -1.0 | Fan status based on fan opening |  | boolean | 0.0 |  |

Table. 监控量

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Min | Max | Width | Description | Object Class | Typedef | DefaultValue | Unit |

Table. 标定量

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Min | Max | Width | Description | Object Class | Typedef | DefaultValue | Unit |
| FanCtl\_rClgDesErr\_C | -300.0 | 300.0 | -1.0 | cooling request in case of a error |  | Prc\_100\_rate | 0.0 | % |
| FanCtl\_tiDelStrt\_C | 0.0 | 42949672950.0 | -1.0 | delay time to activte the fan after engine start |  | EngTime\_ms | 0.0 | ms |
| FanCtl\_tiAftRunMax\_C | 0.0 | 42949672950.0 | -1.0 | max fan afterrun time |  | EngTime\_ms | 0.0 | ms |
| FanCtl\_rClgDesARMin\_C | -300.0 | 300.0 | -1.0 | low limit of abourt condition of fan afterrun dependent on colling request |  | Prc\_100\_rate | 0.0 | % |
| FanCtl\_facCorSpd\_MAP | 0.0 | 1.0 | [6 6] | System constants for the number of Xy co-ordinates for the map FANCTL\_FACCORSPD\_MAP |  | Factor | [1 1 1 1 1 1 ; 1 1 1 1 1 1 ; 1 1 1 1 1 1 ; 1 1 1 1 1 1 ; 1 1 1 1 1 1 ; 1 1 1 1 1 1 ] |  |
| FanCtl\_facCorSpd\_MAPX | -3000.0 | 3000.0 | 6.0 | System constants for the number of X co-ordinates for the map FANCTL\_FACCORSPD\_MAP |  | AirPressure\_kPa | [0 20 40 60 80 100] | kPa |
| FanCtl\_facCorSpd\_MAPY | -50.0 | 150.0 | 6.0 | System constants for the number of Y co-ordinates for the map FANCTL\_FACCORSPD\_MAP |  | Temp\_deg | [0 20 40 60 80 100] | deg |
| FanCtl\_nSpdDes\_MAP | -32768.0 | 32767.0 | [6 6] | System constants for the number of XY co-ordinates for the map FANCTL\_NSPDDES\_MAP |  | FanSpd\_rpm | [10 10 10 10 10 10 ; 20 20 20 20 20 20 ; 40 40 40 40 40 40 ; 60 60 60 60 60 60 ; 80 80 80 80 80 80 ; 100 100 100 100 100 100 ] | rpm |
| FanCtl\_nSpdDes\_MAPY | 0.0 | 6000.0 | 6.0 | System constants for the number of Y co-ordinates for the map FANCTL\_NSPDDES\_MAP |  | EngSpeed\_rpm | [0 20 40 60 80 100] | rpm |
| FanCtl\_nSpdDes\_MAPX | -300.0 | 300.0 | 6.0 | System constants for the number of X co-ordinates for the map FANCTL\_NSPDDES\_MAP |  | Prc\_100\_rate | [0 20 40 60 80 100] | % |
| FanCtl\_facCorErr\_C | 0.0 | 1.0 | -1.0 | correction factor of fan in case of an error |  | Factor | 0.0 |  |
| FanCtl\_nSpdWin1L\_C | -32768.0 | 32767.0 | -1.0 | low limit: window 1 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpdWin1R\_C | -32768.0 | 32767.0 | -1.0 | high limit: window 1 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpdWin2L\_C | -32768.0 | 32767.0 | -1.0 | low limit: window 2 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpdWin2R\_C | -32768.0 | 32767.0 | -1.0 | high limit: window 2 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpdWin3L\_C | -32768.0 | 32767.0 | -1.0 | low limit: window 3 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpdWin3R\_C | -32768.0 | 32767.0 | -1.0 | high limit: window 3 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpdMin\_C | -32768.0 | 32767.0 | -1.0 | Hysteresis minimum: fan speed as minimal fan speed fan 1 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpdMinDelta\_C | -32768.0 | 32767.0 | -1.0 | Hysteresis delta: fan speed as minimal fan speed fan1 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpdFanMax\_C | -32768.0 | 32767.0 | -1.0 | Maximal fan speed fan 1 |  | FanSpd\_rpm | 100.0 | rpm |
| FanCtl\_tiTrqResv\_C | 0.0 | 4294967295.0 | -1.0 | Time for reserve torque for Fan1 |  | State\_uint32 | 0.0 |  |
| Fan\_rHysHi\_C | -300.0 | 300.0 | -1.0 | High threshold of hysterisis to set digital fan power stage output to true |  | DutyCycle\_rate | 10.0 | % |
| Fan\_rHysLo\_C | -300.0 | 300.0 | -1.0 | Low threshold of hysterisis to set digital fan power stage output to true |  | DutyCycle\_rate | 10.0 | % |
| FanCtl\_facCorSpd2\_MAP | 0.0 | 1.0 | [6 6] | System constants for the number of XY co-ordinates for the map FANCTL\_FACCORSPD2\_MAP |  | Factor | [1 1 1 1 1 1 ; 1 1 1 1 1 1 ; 1 1 1 1 1 1 ; 1 1 1 1 1 1 ; 1 1 1 1 1 1 ; 1 1 1 1 1 1 ] |  |
| FanCtl\_facCorSpd2\_MAPX | -3000.0 | 3000.0 | 6.0 | System constants for the number of X co-ordinates for the map FANCTL\_FACCORSPD2\_MAP |  | AirPressure\_kPa | [0 20 40 60 80 100] | kPa |
| FanCtl\_facCorSpd2\_MAPY | -50.0 | 150.0 | 6.0 | System constants for the number of Y co-ordinates for the map FANCTL\_FACCORSPD2\_MAP |  | Temp\_deg | [0 20 40 60 80 100] | deg |
| FanCtl\_nSpdDes2\_MAP | -32768.0 | 32767.0 | [6 6] | System constants for the number of XY co-ordinates for the map FANCTL\_NSPDDES2\_MAP |  | FanSpd\_rpm | [10 10 10 10 10 10 ; 20 20 20 20 20 20 ; 40 40 40 40 40 40 ; 60 60 60 60 60 60 ; 80 80 80 80 80 80 ; 100 100 100 100 100 100 ] | rpm |
| FanCtl\_nSpdDes2\_MAPX | -300.0 | 300.0 | 6.0 | System constants for the number of X co-ordinates for the map FANCTL\_NSPDDES2\_MAP |  | Prc\_100\_rate | [0 20 40 60 80 100] | % |
| FanCtl\_nSpdDes2\_MAPY | 0.0 | 6000.0 | 6.0 | System constants for the number of Y co-ordinates for the map FANCTL\_NSPDDES2\_MAP |  | FanSpd\_rpm | [0 20 40 60 80 100] | rpm |
| FanCtl\_nSpd2Win1L\_C | -32768.0 | 32767.0 | -1.0 | lower limit: fan speed window 1 fan 1/fan 2 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpd2Win1R\_C | -32768.0 | 32767.0 | -1.0 | upper limit: fan speed window 1 fan 1/fan 2 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpd2Win2L\_C | -32768.0 | 32767.0 | -1.0 | lower limit: fan speed window 2 fan 1/fan 2 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpd2Win2R\_C | -32768.0 | 32767.0 | -1.0 | upper limit: fan speed window 2 fan 1/fan 2 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpd2Win3L\_C | -32768.0 | 32767.0 | -1.0 | lower limit: fan speed window 3 fan 1/fan 2 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpd2Win3R\_C | -32768.0 | 32767.0 | -1.0 | upper limit: fan speed window 3 fan 1/fan 2 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpdMin2\_C | -32768.0 | 32767.0 | -1.0 | Hysteresis minimum: fan speed as minimal fan speed fan 2 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpdMinDelta2\_C | -32768.0 | 32767.0 | -1.0 | Hysteresis delta: fan speed as minimal fan speed fan 2 |  | FanSpd\_rpm | 0.0 | rpm |
| FanCtl\_nSpdFan2Max\_C | -32768.0 | 32767.0 | -1.0 | Maximal fan speed fan 2 |  | FanSpd\_rpm | 100.0 | rpm |
| FanCtl\_tiTrqResv2\_C | 0.0 | 4294967295.0 | -1.0 | Time for reserve torque for Fan2 |  | State\_uint32 | 0.0 |  |

Table. 系统常量

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Value | Description | Object Class | Typedef | Unit |
| FANCTL\_STOFF | 1.0 | Cooling fan stop |  | State\_uint8 |  |
| FANCTL\_STNORMAL | 2.0 | Cooling fan operation |  | State\_uint8 |  |
| FANCTL\_STAFTRUN | 3.0 | cooling fan after Operation |  | State\_uint8 |  |
| PRC\_100 | 100.0 | 100 percent |  | Prc\_100\_rate | % |
| PRC\_ZERO | 0.0 | 0 percent |  | Prc\_100\_rate | % |
| NUMFANS\_SY | 2.0 | number of engine fan available |  | State\_uint8 |  |
| STSP\_SY | 0.0 | Start-Stop Functionality |  | State\_uint8 |  |