

```
1 #ifndef _QUATERNION_H_
2 #define _QUATERNION_H_
3
4 #include "stm32f4xx_hal.h"
5 #include "basic_math.h"
6
7 // Type define for quaternion
8 typedef struct
9 {
10     float q0, q1, q2, q3;
11 } QuaternionTypeDef;
12
13 // Type define for Euler angle
14 typedef struct
15 {
16     float thx, thy, thz;
17 } EulerAngleTypeDef;
18
19
20 void QuaternionNorm(QuaternionTypeDef *q);
21 void QuaternionMult(QuaternionTypeDef *qa, QuaternionTypeDef *qb, QuaternionTypeDef *qo);
22 void QuaternionRotation(QuaternionTypeDef *qr, QuaternionTypeDef *qv, QuaternionTypeDef
    *qo);
23 void QuaternionConj(QuaternionTypeDef *qa, QuaternionTypeDef *qo);
24 void QuaternionToEuler(QuaternionTypeDef *qr, EulerAngleTypeDef *ea);
25
26 #define MAX_RAD    1.5
27
28
29 #endif /* _QUATERNION_H_ */
```