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\* polynomial\_regression.h

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#ifndef INC\_POLYNOMIAL\_REGRESSION\_H\_

#define INC\_POLYNOMIAL\_REGRESSION\_H\_

#include "stm32f4xx\_hal.h"

#include "stdint.h"

#include "math.h"

#include "stdlib.h"

#include "stdbool.h"

#define ATOL 1e-08

#define RTOL 1e-05

#ifdef \_\_cplusplus

extern "C" {

#endif

#define ARRAY\_LEN(array) (sizeof(array) / sizeof(array[0]))

typedef float (\*order)(float);

typedef struct \_\_attribute\_\_((\_\_packed\_\_)) Poly\_Regression {

float c4, c3, c2, c1, c0;

} pr;

typedef struct \_\_attribute\_\_((\_\_packed\_\_)) SmoothStep {

float in, min, max;

} SStep;

extern pr m[6];

extern SStep a;

float polyregress(pr \*pr, const float input);

float smooth\_step(SStep \*s, float in, order ord);

float sstep\_1th(float x);

float sstep\_2th(float x);

float sstep\_3th(float x);

float clamp(float val, float min, float max);

float lin\_interp(float x, float in\_min, float in\_max, float out\_min, float out\_max);

/\*floating point error (inexact)

https://floating-point-gui.de/

https://stackoverflow.com/questions/70780366/why-should-you-ever-use-a-float-instead-of-a-double

https://stackoverflow.com/questions/4584637/double-or-float-which-is-faster

https://docs.oracle.com/cd/E19957-01/806-3568/ncg\_goldberg.html

https://fastbitlab.com/microcontroller-embedded-c-programming-lecture-64-working-with-float-and-double-variables/

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float close\_to\_zero(float value);

#ifdef \_\_cplusplus

}

#endif

#endif /\* INC\_POLYNOMIAL\_REGRESSION\_H\_ \*/