Automotive Math and Motor Control Library (AMMCLib)

AMMCLIB

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The Automotive Math and Motor Control Library (AMMCLib) set provides essential building blocks for rapid development of automotive embedded applications with high-performance arithmetic, trigonometric, digital signal processing and math functions. The AMMCLib is available as a production-ready precompiled or source code package.

A significant portion of the AMMCLib supports both sensor-based and sensorless motor control applications; it also assists with fixed-point fractional 16/32-bit and single-precision floating-point arithmetic. All AMMCLib functions come with MATLAB® and Simulink® bit-accurate models for model-based design, simulation and code generation supporting Embedded Coder®.
Auto AMMCLIB General Architecture Block Diagram

GMCLIB

- Park/Clark Transformation
- Inverse Park/Clark
- Space Vector Modulation
- DC Bus Ripple Elimination
- PMSM Decoupling

AMCLIB

- BackEMF Observer
- Tracking Observer

GFLIB

- Sine, Cosine, Tangent
- Inverse Sine, Cosine, Tangent
- Hysteresis
- LUT, Ramp, Limitation
- First, Second Order IIR Filter

GDFLIB

- Sine, Cosine, Tangent
- Inverse Sine, Cosine, Tangent
- Hysteresis
- LUT, Ramp, Limitation
- First, Second Order IIR Filter

MLIB

- Absolute Value
- Addition, Subtraction
- Multiplication, Division
- Right/Left Shift
- Type Conversion

Auto AMMCLIB Architecture for KEA Block Diagram

GMCLIB

- Park/Clark Transformation
- Inverse Park/Clark
- Space Vector Modulation
- DC Bus Ripple Elimination
- PMSM Decoupling

GFLIB

- Sine, Cosine, Tangent
- Inverse Sine, Cosine, Tangent
- Hysteresis
- LUT, Ramp, Limitation
- First, Second Order IIR Filter

GDFLIB

- Sine, Cosine, Tangent
- Inverse Sine, Cosine, Tangent
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- LUT, Ramp, Limitation
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MLIB

- Absolute Value
- Addition, Subtraction
- Multiplication, Division
- Right/Left Shift
- Type Conversion
Auto AMMCLIB Architecture for S32Z/E and S32V Block Diagram

- **General Motor Control Library**
  - Park/Clark Transformation
  - Inverse Park/Clark
  - Space Vector Modulation
  - DC Bus Ripple Elimination
  - PMSM Decoupling
  - BackEMF Observer
  - Tracking Observer

- **Advanced Motor Control Library**

- **General Function Library**
  - Sine, Cosine, Tangent
  - Inverse Sine, Cosine, Tangent
  - Hysteresis
  - LUT, Ramp, Limitation
  - First, Second Order IIR Filter

- **General Digital Filter Library**

- **Mathematical Library**
  - Absolute Value
  - Addition, Subtraction
  - Multiplication, Division
  - Right/Left Shift
  - Type Conversion

- **Advanced Digital Filter Library**
  - Vector/Matrix Multiplication
  - Kalman Filter
  - FFT
  - Linear System
  - Solver
  - Cholesky
  - Decomposition
  - RBF Interpolation

Automotive software General Block Diagram

- SERVICES / APPLICATION SOFTWARE
- MIDDLEWARE
- OS / DRIVERS / SAFETY
- HYPERVISOR (if available)
- ARM CORTEX CORE(S)
- FIRMWARE / HW ACCELERATORS

View additional information for Automotive Math and Motor Control Library (AMMCLib).