

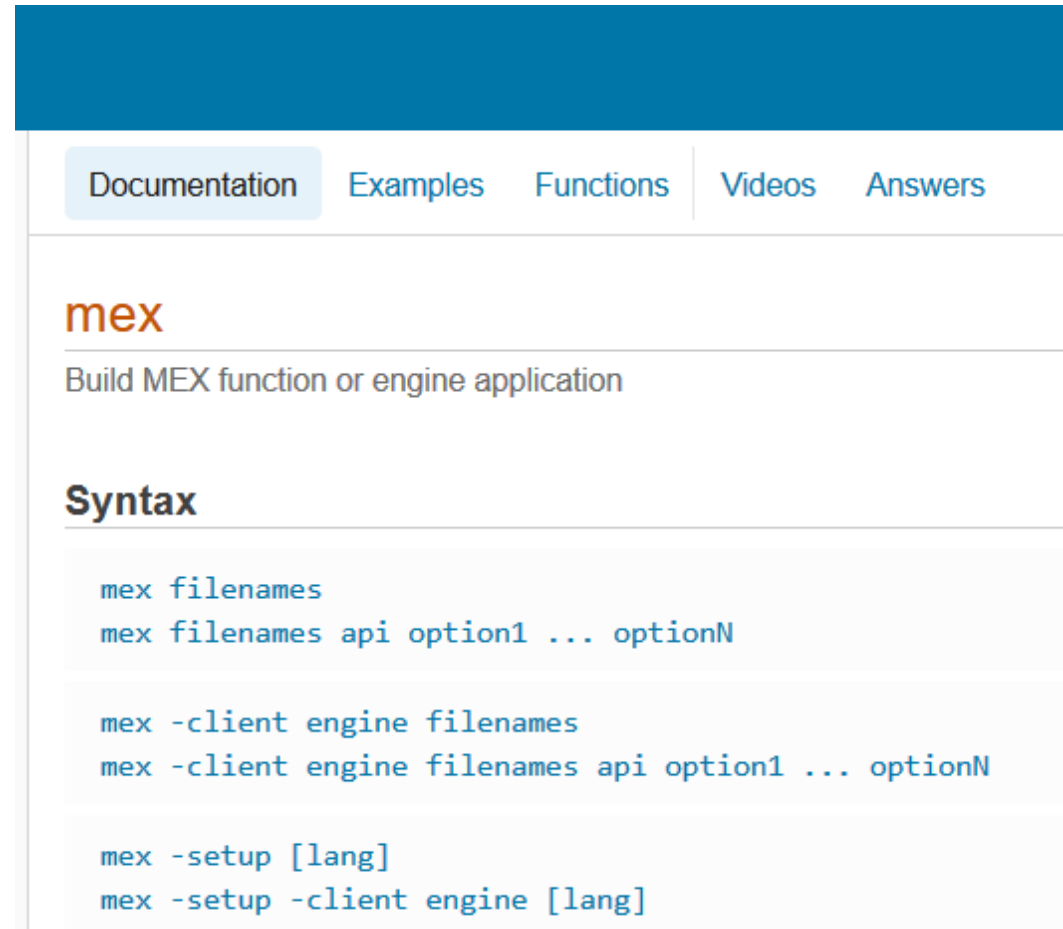
MATLAB Executable and C/C++ Code Generation

Introduction for Participants of Parallel Computing Workshop

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Optimize your code before parallelizing for best performance

- Replace code with MEX functions
 - Generate MATLAB Executable ([MEX](#)) C/C++ or CUDA code from a function.
 - Use MATLAB Coder & GPU Coder Apps to generate code more easily.
 - [Lots of supported functions](#)
 - Massive speed-up for certain applications



The screenshot shows the MATLAB documentation page for the `mex` command. The page has a blue header bar. Below the header, there are navigation tabs: "Documentation" (selected), "Examples", "Functions", "Videos", and "Answers". The main content area has a blue background for the title "mex" and a subtitle "Build MEX function or engine application". Below this, there is a "Syntax" section with a light blue background. The syntax examples are listed in a code block:

```
mex filenames
mex filenames api option1 ... optionN

mex -client engine filenames
mex -client engine filenames api option1 ... optionN

mex -setup [lang]
mex -setup -client engine [lang]
```

MATLAB to C/C++ Made Easy

On Demand Webinar

This webinar demonstrates the workflow for **generating readable and portable C/C++ code** from your MATLAB algorithms **using MATLAB Coder**.

Learn how to **generate C/C++**

- **as MEX-files** to accelerate compute-intensive portions of your MATLAB algorithm
- **from MATLAB** code that can be compiled from desktop systems to embedded devices
- **from deep learning networks** along with pre- and postprocessing code as inference engines



<https://www.mathworks.com/videos/matlab-to-c-made-easy-81870.html>

Code Generation Training

Webinar Series with Examples and Exercise Materials

This training series will help you get started with **generating readable and editable standalone C/C++ code from MATLAB and Simulink**. It will **walk you through the workflow and teach you how to navigate and optimize generated code**.

Access the videos here:

- www.mathworks.com/codegen-training

This entry contains all materials for the online Code Generation Training:

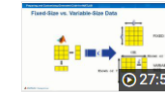
- [GitHub Repository](#)
- [MATLAB FileExchange](#)

Training



Code Generation with MATLAB

Learn how to generate editable, customizable code from MATLAB code using MATLAB Coder.



Preparing and Customizing Generated Code for MATLAB

Learn how to prepare and optimize MATLAB code for code generation.



Code Generation with Simulink

Learn how to generate editable, customizable code from Simulink Models using Simulink Coder.



Customizing Generated Code with Simulink

Learn how to customize the code generated from Simulink models to balance various design considerations.



System Integration with Simulink

Learn how Simulink can be used as an integration platform for design, simulation, and code generation of multiple software components.

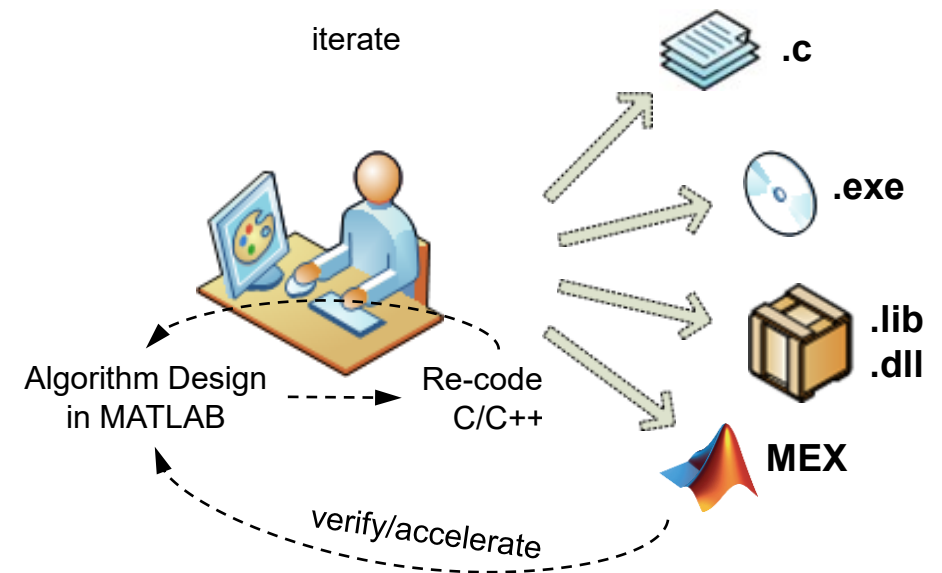


Hardware Deployment with Simulink

Learn how to generate and deploy code directly from Simulink models to embedded computing systems.

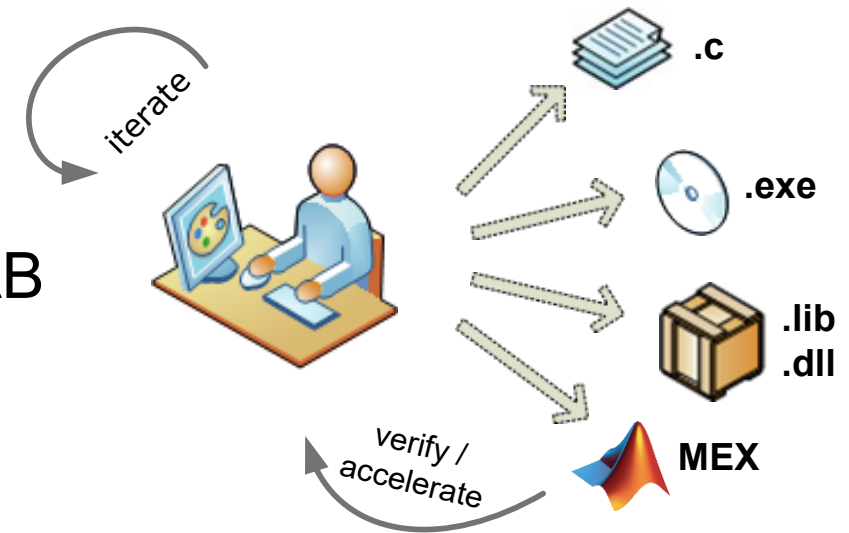
Challenges with Manual Translation of MATLAB to C

- Separate functional and implementation specifications
 - Leads to multiple implementations which are inconsistent
 - Hard to modify requirements during development
 - Difficult to keep MATLAB code and C code in sync
- Manual coding errors
- Time consuming and expensive process



Automatic Translation of MATLAB to C

- Maintain one design in MATLAB
- Design faster and get to C quickly
- Test more systematically and frequently
- Spend more time improving algorithms in MATLAB



Acceleration Using MEX

- Speedup factor will vary
- When you **may** see a speedup:
 - Often for communications or signal processing
 - Likely for loops with states or when vectorization is not possible
 - Always for fixed point
- When you **may not** see a speedup:
 - MATLAB implicitly multithreads computation
 - Built in functions that call BLAS or IPP

MATLAB Coder Resources

- Product Page:
 - <http://www.mathworks.com/products/matlab-coder>
- Supported Language Features and Functions
 - New functions and features are supported each release
 - <http://www.mathworks.com/help/coder/language-supported-for-code-generation.html>