Installation of IGA-ADS code

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1. Compiling and running IGA-ADS simulator

The source code for the wildfire simulation is available on Github: `https://github.com/marcinlos/iga-ads`.
To download it, execute the following command in your terminal:

```
git clone https://github.com/marcinlos/iga-ads
```

1.1. Installing dependencies

Compiling the code and its dependencies requires installing a few libraries and tools. The following command installs the prerequisites on Ubuntu 24.04.

```
apt-get update && apt-get install \
    libzstd-dev         \
    curl                \
    gfortran            \
    g++                 \
    cmake               \
    ninja-build         \
    liblapack-dev       \
    libboost-all-dev    \
    llvm-dev            \
    libmumps-dev
```

Other distributions may require adjustments to this command. Alternatively, it is possible to skip this step and use the Docker/Podman image that contains the necessary packages (described later).

To compile the dependencies of the wildfire code, select some directories for source code and build artifacts of the dependencies:

```
DEPS="/directory/for/sources"
DEPS_BUILD="/directory/for/installing/libraries"
```

Important: these directories should not exist (they will be created by a script). Then, execute

```
iga-ads/scripts/install-dependencies.sh "${DEPS}"
"${DEPS_DUILD}"
```

1.2. Compiling IGA-ADS simulation code

The IGA-ADS framework the wildfire code is a part of uses CMake build system. First, create a build directory, e.g.

```
cd iga-ads; mkdir build
```

and generate the build scripts by executing

```
cmake \
    -S . \
    -B build \
    -D CMAKE_BUILD_TYPE=Release \
    -D ADS_USE_GALOIS=ON \
    -D ADS_USE_MUMPS=OFF \
    -D CMAKE_PREFIX_PATH="${DEPS}$"
```

Finally, to compile the code, execute

```
cmake --build build -j$(nproc) --target ads-example-fire
```

After that step, the compiled wildfire simulation is stored in `build/examples/fire`.

1.3. Running the simulation

The compiled simulation can be executed as

```
build/examples/fire <N> <p> <threads>
```

where `N` is the size of the mesh in each dimension, `p` is the B-spline degree, and `threads` is the number of threads to use.

1.4. Using container

To make setting up the code easier, we also provide a container definition and a set of recipies for the `just` task runner (`https://github.com/casey/just`). Using these, the entire process can be simplified to

```
git clone https://github.com/marcinlos/iga-ads
cd iga-ads
just image
just shell
```

and in the newly opened container shell:

```
just config
just build
```

These commands build the simulation in the `/build` directory of the container. Afterwards, execution of the simulation follows the procedure described in sec. 1.3.