

Introduction to C++

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1 Download, compile, install BONMIN

1. Go to <https://projects.coin-or.org/Bonmin>
2. Follow instructions of page <https://projects.coin-or.org/Bonmin/wiki/GettingStarted> (use subversion)
3. Download the two files <http://www.lix.polytechnique.fr/~dambrosio/hsl/mc19ad.f> and <http://www.lix.polytechnique.fr/~dambrosio/hsl/ma27ad.f> to be saved in ThirdParty/HSL directory (see the last part of page <https://projects.coin-or.org/Bonmin/wiki/ThirdParty>).

2 Learn how to pass a mixed integer nonlinear programming problem to BONMIN

1. Look at example in directory Bonmin-stable/Bonmin/examples/CppExample and Bonmin-stable/Bonmin/build/examples/CppExample for the Makefile
2. Copy MyTMINLP.hpp, Makefile, MyBonmin.cpp, MyTMINLP.cpp and modify the last 3 in such a way that the optimization problem solved is:

$$\begin{aligned} \min & 4.0x^2 - 2.1x^4 + 0.3333x^6 + xy - 4.0y^2 + 4.0y^4 \\ & -2 \leq x \leq 2 \\ & -1 \leq y \leq 1 \\ & y \text{ integer} \end{aligned}$$

3. Solve the problem using starting points $x = -2$ and $y = -1$
4. Create a class called MySolution starting from the file MySolution.hpp (download it <http://www.lix.polytechnique.fr/~dambrosio/MySolution.hpp>)
5. Modify the MyBonmin.cpp in such a way that the problem is solved multiple times with different options configurations. The objective function value and the status of the solution provided has to be store in a list/vector of MySolution.
6. The program end by printing the objective function value of the best solution found.