

```
2 double L2errorCRDiscretizationDirichletBVP(const std::string &filename) {
3     double l2_error;
4
5     // TODO: task 2-14.x)
6     // Right-hand-side source function
7     auto f = [](Eigen::Vector2d x) -> double {
8         return (2. * M_PI * M_PI + x.prod()) * std::sin(M_PI * x(0)) *
9             std::sin(M_PI * x(1));
10    };
11    // Reaction coefficient
12    auto gamma = [](Eigen::Vector2d x) -> double { return x.prod(); };
13    // Analytic solution
14    auto u = [](Eigen::Vector2d x) -> double {
15        return std::sin(M_PI * x(0)) * std::sin(M_PI * x(1));
16    };
17
18    // Read mesh from file
19    auto mesh_factory = std::make_unique<lf::mesh::hybrid2d::MeshFactory>(2);
20    const lf::io::GmshReader reader(std::move(mesh_factory), filename);
21
22    // Build CR FE space
23    auto fe_space = std::make_shared<CRFeSpace>(reader.mesh());
24
25    // Solve homogeneous Dirichlet problem
26    Eigen::VectorXd mu = solveCRDirichletBVP(fe_space, gamma, f);
27    // Compute L2 norm of error
28    l2_error = computeCRL2Error(fe_space, mu, u);
29    return l2_error;
30 }
```