

C++ code 4.1.11: Compute the error on a grid of a given size. → [GitLab](#)

```
2 double compgriderr(unsigned int M) {
3     double err = 0;
4     // Obtain the Mehrstellen solution to the PDE
5     const auto f = [](double x, double y) {
6         return std::sin(M_PI * x) * std::sin(M_PI * y);
7     };
8     const Eigen::VectorXd mu = solveMehrstellen(f, M);
9     // The exact solution u
10    const auto u = [](double x, double y) {
11        return std::sin(M_PI * x) * std::sin(M_PI * y) / (2 * M_PI * M_PI);
12    };
13    // Find the maximum difference between the discretized and exact
14        solution at
15        the mesh nodes
16    const double h = 1. / (M + 1);
17    for (int i = 0; i < M; ++i) {
18        for (int j = 0; j < M; ++j) {
19            const double x = (i + 1) * h;
20            const double y = (j + 1) * h;
21            // The index of the node at (i, j)
22            const int k = i * M + j;
23            // Update the error norm
24            const double diff = std::fabs(u(x, y) - mu[k]);
25            if (diff > err) {
26                err = diff;
27            }
28        }
29    }
30    return err;
}
```