

C++ code 9.10.20: Alternative implementation of `computeMV()` → [GitLab](#)

```
2 template <typename RHOFUNCTION>
3 Eigen::SparseMatrix<double> computeMV_alt(
4     std::shared_ptr<If::uscalfe::FeSpaceLagrangeO1<double>> fe_space_V,
5     RHOFUNCTION &&rho) {
6     const If::mesh::Mesh &mesh{*(fe_space_V->Mesh())};
7     const If::assemble::DofHandler &dofh_V{fe_space_V->LocGlobMap()};
8     const If::uscalfe::size_type N_dofs_V(dofh_V.NumDofs());
9
10    // Reserve space for a sparse diagonal matrix
11    Eigen::SparseMatrix<double> M_V(N_dofs_V, N_dofs_V);
12    M_V.reserve(Eigen::VectorXi::Constant(N_dofs_V, 1));
13
14    // Determine area of mesh neighborhood of every node
15    const auto areas{areasOfAdjacentCells(fe_space_V->Mesh())};
16    // Loop over all nodes
17    for (const If::mesh::Entity *node : mesh.Entities(2)) {
18        // Obtain position vector of node
19        const Eigen::Vector2d node_pos{
20            If::geometry::Corners(*(node->Geometry())) .col(0)};
21        // Evaluate coefficient function at node
22        const double rho_val = rho(node_pos);
23        // Find global index of dof associated with the node
24        const std::span<const If::assemble::gdof_idx_t> node_dofs(
25            dofh_V.GlobalDofIndices(*node));
26        LF_ASSERT_MSG(node_dofs.size() == 1, "A node has to carry exactly one dof!");
27        // Global index of tent function sitting on the node
28        const If::assemble::gdof_idx_t dof_no = node_dofs[0];
29        M_V.insert(dof_no, dof_no) = areas(*node) * rho_val / 3.0;
30    }
31    return M_V;
32 }
```