

C++ code 9.1.20: Sub-problem (9-1.f): Function `rhsVectorheatSource()` → [GitLab](#)

```
2 Eigen::VectorXd rhsVectorheatSource(const lf::assemble::DofHandler &dofh,
3                                     double time) {
4     // Dimension of finite element space
5     const lf::uscalfe::size_type N_dofs(dofh.NumDofs());
6     // Right-hand side vector has to be set to zero initially
7     Eigen::VectorXd phi(N_dofs);
8     // Functor for computing the source function at 2d coordinates
9     auto f = [time](Eigen::Vector2d x) -> double {
10         const double PI = 3.14159265358979323846;
11         Eigen::Vector2d v(std::cos(time * PI), std::sin(time * PI));
12         return ((x - 0.5 * v).norm() < 0.5) ? 1.0 : 0.0;
13     };
14     auto mesh_p = dofh.Mesh(); // pointer to current mesh
15     phi.setZero();
16
17     /* Assembling right-hand side source vector */
18     // Initialize object taking care of local computations on all cells.
19     TrapRuleLinFEElemVecProvider<decltype(f)> elvec_builder(f);
20     // Computing right hand side vector
21     // Invoke assembly on cells (codim == 0 as first argument)
22     lf::assemble::AssembleVectorLocally(0, dofh, elvec_builder, phi);
23
24     /* Enforce the zero Dirichlet boundary conditions */
25     // Obtain an array of boolean flags for the vertices of the mesh: 'true'
26     // indicates that the vertex lies on the boundary. This predicate will
27     // guarantee that the computations are carried only on the boundary vertices
28     auto bd_flags{lf::mesh::utils::flagEntitiesOnBoundary(mesh_p, 2)};
29
30     // Assigning zero to the boundary values of phi
31     for (const lf::mesh::Entity *vertex : mesh_p->Entities(2)) {
32         if (bd_flags(*vertex)) {
33             auto dof_idx = dofh.GlobalDofIndices(*vertex);
34             LF_ASSERT_MSG(
35                 dofh.NumLocalDofs(*vertex) == 1,
36                 "Too many global indices were returned for a vertex entity!");
37             phi(dof_idx[0]) = 0.0;
38         }
39     }
40     return phi;
41 }
```