

C++ code 9.1.19: Sub-problem (9-1.f): **Eval()** method returning element vector → [GitLab](#)

```
2 template <typename FUNCTOR>
3 Eigen::Vector3d TrapRuleLinFEElemVecProvider<FUNCTOR>::Eval(
4     const If::mesh::Entity &tria) {
5     Eigen::Vector3d ElemVec;
6     // Throw error in case no triangular cell
7     LF_VERIFY_MSG(tria.RefEl() == If::base::RefEl::kTria(),
8         "Unsupported cell type " << tria.RefEl());
9     // Obtain vertex coordinates of the triangle in a 2x3 matrix
10    const auto corners{If::geometry::Corners(*(tria.Geometry()))};
11    // Compute the scaling factor for the local load vector
12    const double area_third = If::geometry::Volume(*(tria.Geometry())) / 3.0;
13    LF_ASSERT_MSG((corners.cols() == 3) && (corners.rows() == 2),
14        "Invalid vertex coordinate " << corners.rows() << "x"
15        << corners.cols() << " matrix");
16    ElemVec = Eigen::Vector3d(area_third * f_(corners.col(0)),
17        area_third * f_(corners.col(1)),
18        area_third * f_(corners.col(2)));
19    return ElemVec;
20 }
```