

C++ code 5.2.48: Implementation of `matR()` → [GitLab](#)

```
2 Eigen::SparseMatrix<double> matR(  
3     const Eigen::Matrix<double, 2, Eigen::Dynamic> &knots) {  
4     const Eigen::Index M = knots.cols() - 1;  
5     // Reserve enough space for the tridiagonal matrix  
6     Eigen::SparseMatrix<double> R(M - 1, M - 1);  
7     R.reserve(Eigen::RowVectorXi::Constant(M - 1, 3));  
8     // Compute the cell values for the coefficient  
9     const Eigen::VectorXd sigma = coeff_sigma(knots);  
10    // Fill in the matrix  
11    double h = 1. / static_cast<double>(M);  
12    R.insert(0, 0) = (sigma(0) + sigma(1)) / h;  
13    R.insert(0, 1) = -sigma(1) / h;  
14    for (int i = 1; i < M - 2; ++i) {  
15        R.insert(i, i - 1) = -sigma(i) / h;  
16        R.insert(i, i) = (sigma(i) + sigma(i + 1)) / h;  
17        R.insert(i, i + 1) = -sigma(i + 1) / h;  
18    }  
19    R.insert(M - 2, M - 3) = -sigma(M - 2) / h;  
20    R.insert(M - 2, M - 2) = (sigma(M - 2) + sigma(M - 1)) / h;  
21    // Clean the CRS format  
22    R.makeCompressed();  
23    return R;  
24 }
```