

## C++ code 5.17.4: Function `limitByExtrapolation()` [Get it on GitLab.](#)

```
2 template <class SEQGEN>
3 double limitByExtrapolation(SEQGEN &&seq, double rtol = 1.0E-6,
4                             double atol = 1.0E-8, unsigned int maxdeg = 20) {
5     seq.reset();
6     std::vector<double> h{1};
7     std::vector<double> s{seq.next()};
8     // using Aitken-Neville scheme with x=0, see
9     // [Lecture → Code 5.2.3.10]
10    for (unsigned i = 1; i < maxdeg; ++i) {
11        // Next data point (hi, si)
12        h.push_back(1.0 / (i + 1.0)); // First coordinate of data point
13        s.push_back(seq.next()); // Second coordinate of data point
14        // Aitken-Neville update
15        for (int k = i - 1; k >= 0; --k)
16            s[k] = s[k + 1] - (s[k + 1] - s[k]) * h[i] / (h[i] - h[k]);
17        // termination of extrapolation when desired tolerance is reached
18        const double errest = std::abs(s[1] - s[0]); // error indicator
19        if (errest < rtol * std::abs(s[0]) || errest < atol) { //
20            // Return value extrapolated from largest number of data points
21            return s[0];
22        }
23    }
24    throw std::runtime_error("limitByExtrapolation failed to converge!");
25    return std::nan("");
26 }
```