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```
#include "progonka.h"
#include "numerics.h"

vector<double> progonka(int N, const double low,
                        const double diag, const double up,
                        const vector<double> &right_side)
{
    vector<double> A(N - 1), B(N - 1), result(N);

    // descente
    A[0] = -up / diag;
    B[0] = right_side[0] / diag;
    double denom;
    for (int i = 1; i < N - 1; i++)
    {
        denom = diag + low * A[i - 1];
        A[i] = -up / denom;
        B[i] = (right_side[i] - low * B[i - 1]) / denom;
    }

    // remontee
    result[N - 1] = (right_side[N - 1] - low * B[N - 2]) / (diag + low * A[N - 2]);
    for (int i = N - 2; i >= 0; i--)
    {
        result[i] = A[i] * result[i + 1] + B[i];
    }

    return result;
}
```