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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;
}
```

## References