Write a self-contained function block in IEC 61131-3 Structured Text to compute a spline interpolation.

Here's an implementation of a cubic spline interpolation function block in IEC 61131-3 Structured Text:

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```
FUNCTION_BLOCK SplineInterpolation
VAR_INPUT
    xValues : ARRAY[*] OF REAL; // Array of x values
    yValues : ARRAY[*] OF REAL; // Array of y values
    x : REAL; // The x value to be interpolated
END_VAR

VAR_OUTPUT
    y : REAL; // The interpolated y value
END_VAR

VAR
    n : UINT; // Number of intervals
    h : ARRAY[*] OF REAL; // Array of intervals
    a : ARRAY[*] OF REAL;
    b : ARRAY[*] OF REAL;
    c : ARRAY[*] OF REAL;
    d : ARRAY[*] OF REAL;
    alpha : ARRAY[*] OF REAL;
    l : ARRAY[*] OF REAL;
    mu : ARRAY[*] OF REAL;
    z : ARRAY[*] OF REAL;
    i : UINT; // Loop counter
    k : UINT; // Loop counter
END_VAR

METHOD CalculateSplineCoefficients : BOOL
    n := SIZEOF(xValues) - 1;
    FOR i := 0 TO n - 1 DO
        h[i] := xValues[i + 1] - xValues[i];
    END_FOR;

    FOR i := 1 TO n - 1 DO
        alpha[i] := (3 / h[i]) * (yValues[i + 1] - yValues[i]) - (3 / h[i -
    END_FOR;

    l[0] := 1;
    mu[0] := 0;
    z[0] := 0;

    FOR i := 1 TO n - 1 DO
        l[i] := 2 * (xValues[i + 1] - xValues[i - 1]) - h[i - 1] * mu[i - 1
        mu[i] := h[i] / l[i];
        z[i] := (alpha[i] - h[i - 1] * z[i - 1]) / l[i];
    END_FOR;

    l[n] := 1;
    z[n] := 0;
    c[n] := 0;

    FOR k := 0 TO n - 1 DO
        i := (n - 1) - k;
        c[i] := z[i] - mu[i] * c[i + 1];
        b[i] := (yValues[i + 1] - yValues[i]) / h[i] - h[i] * (c[i + 1] + 2
        d[i] := (c[i + 1] - c[i]) / (3 * h[i]);
    END_FOR;

    RETURN TRUE;
END_METHOD

METHOD Interpolate : REAL
    VAR
        j : UINT;
    END_VAR
    FOR j := 0 TO n - 2 DO
        IF x >= xValues[j] AND x <= xValues[j + 1] THEN
            EXIT;
        END_IF;
    END_FOR;
    RETURN yValues[j] + b[j] * (x - xValues[j]) + c[j] * POWER(x - xValues[
END_METHOD

METHOD Execute : BOOL
    IF CalculateSplineCoefficients() THEN
        y := Interpolate();
        RETURN TRUE;
    ELSE
        RETURN FALSE;
    END_IF;
END_METHOD
END_FUNCTION_BLOCK
```

continue

Here is an example of how to use the `SplineInterpolation` function block in your main program:

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```
PROGRAM Main
VAR
    spline : SplineInterpolation;
    xValues : ARRAY[1..5] OF REAL := [1, 2, 3, 4, 5];
    yValues : ARRAY[1..5] OF REAL := [2, 5, 8, 13, 20];
    xToInterpolate : REAL := 3.5;
    yInterpolated : REAL;
    success : BOOL;
END_VAR

spline(xValues := xValues, yValues := yValues, x := xToInterpolate);
success := spline.Execute();
IF success THEN
    yInterpolated := spline.y;
END_IF;
END_PROGRAM
```

In this example, we've initialized the `SplineInterpolation` function block with some sample `xValues` and `yValues`. We want to find the interpolated `y` value corresponding to `xToInterpolate`. The program calls the `Execute` method, and if it returns `TRUE`, the interpolated `y` value is retrieved from the function block's output.

Please note that this example assumes that the `xValues` array is sorted in ascending order. If the input arrays are not sorted, you should preprocess them before using the `SplineInterpolation` function block.

Also, keep in mind that cubic spline interpolation may not be suitable for all applications, especially when there are sharp changes in the data points. Depending on your specific needs, you might want to consider other interpolation methods such as linear interpolation, polynomial interpolation, or Akima spline interpolation.