ALGORITHM 17
TRDIAG
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procedure   trdiag (a,b,c,d) order : (n) result : (x);

value n;   **array** a, b, c, d, x;   **integer** n;

comment   this procedure gives the solution to the tri-diagonal system of linear algebraic equations:

$$a_1x_2 + b_1x_1 + d_1 = 0$$
$$a_ix_{i+1} + b_ix_i + c_ix_{i-1} + d_i = 0, \quad i = 2,3, \cdots, n-1$$
$$b_nx_n + c_nx_{n-1} + d_n = 0.$$

This method is often used to obtain solutions to second order difference equations;

begin array   gamma [1 : n−1];   **integer** i;   **real** y;
     gamma [1] := −a[1]/b[1];
     x[1] := −d[1]/b[1];

for   i := 2 **step** 1 **until** n−1 **do**

begin   y = b[i] + c[i] × gamma [i − 1];
     gamma [i] := −a[i]/y;   x[i] := − (c[i] × x[i−1] + d[i])/y **end**;
     x[n] := − (c[n] × x[n−1] + d[n])/(b[n] + c[n] × gamma [n−1]);

for   i := n **step** −1 **until** 2 **do**
     x[i − 1] := x[i] × gamma [i − 1] + x[i − 1]

end trdiag