ALGORITHM 104
REDUCTION TO JACOBI
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procedure m2l (n, a, b, c, inform); value n;
type integer n; array a, b, c; procedure inform;
comment: m2l transforms symmetric bandmatrix

\[
\begin{bmatrix}
  & \ddots & \ddots \\
  & & \ddots & b[n] \\
  & & & \ddots & c[n] \\
  \end{bmatrix}
\]
Algorithm 100

Quadratic mechanical motion of a particle (cylinder)

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This algorithm solves for the position and velocity of a particle subject to quadratic forces. The algorithm uses a numerical method to solve a system of differential equations. The input parameters are the mass, position, and velocity of the particle at time zero. The output is the position and velocity of the particle at a specified time.

```
begin
  integer c, r, d;
  real f, m, a, v, x, y, z, t, s;

  c = 1; r = 0.5; d = 0.2;
  f = 9.81; m = 1.0; a = 0.1;
  x = 0.0; y = 0.0; z = 0.0; t = 0.0;

  for t = 0.0 to 10.0 do
    s = s + a * dt;
    x = x + v * dt + 0.5 * a * dt^2;
    y = y + v * dt + 0.5 * a * dt^2;
    z = z + v * dt + 0.5 * a * dt^2;
    v = v + a * dt;
  end

  print(x, y, z);
end
```

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