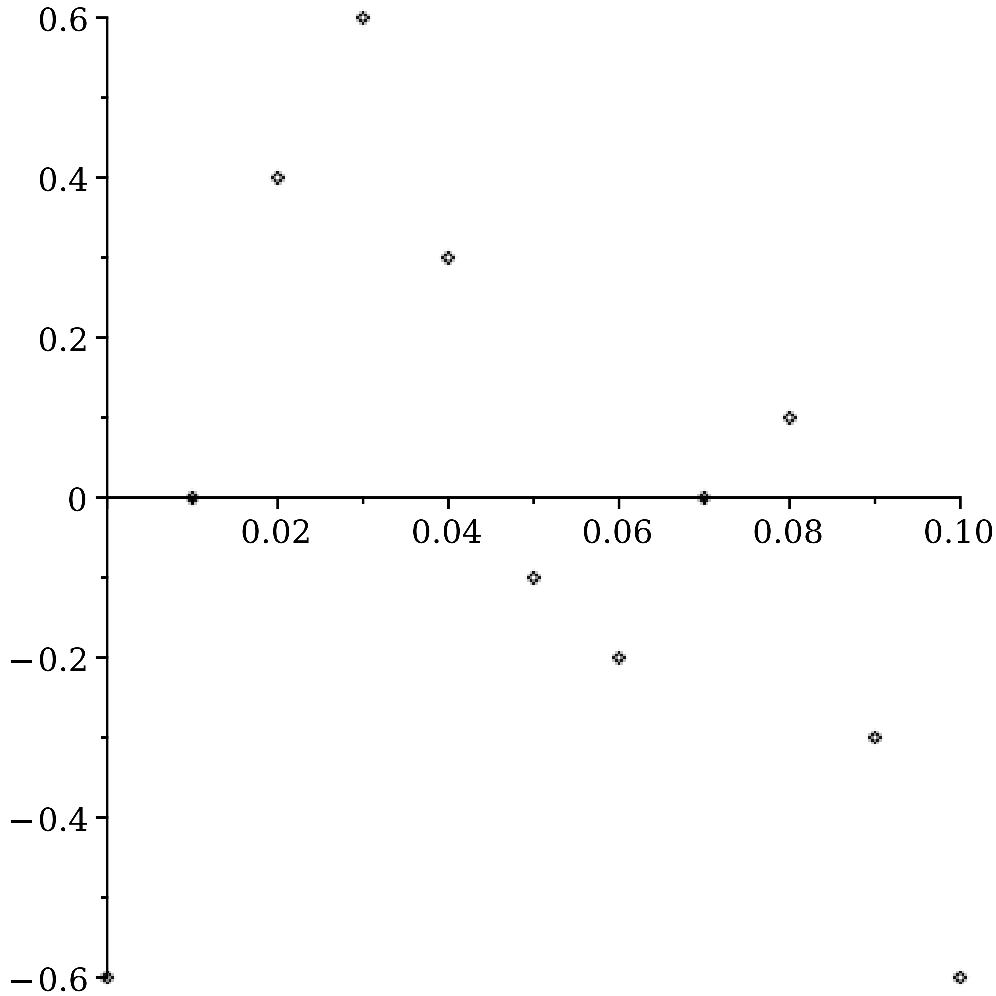
$restart:$

$Times := [0., 0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08, 0.09, 0.10]:$
$Amplitudes := [-0.6, 0., 0.4, 0.6, 0.3, -0.1, -0.2, 0., 0.1, -0.3, -0.6]:$
$pointplot(Times, Amplitudes)$

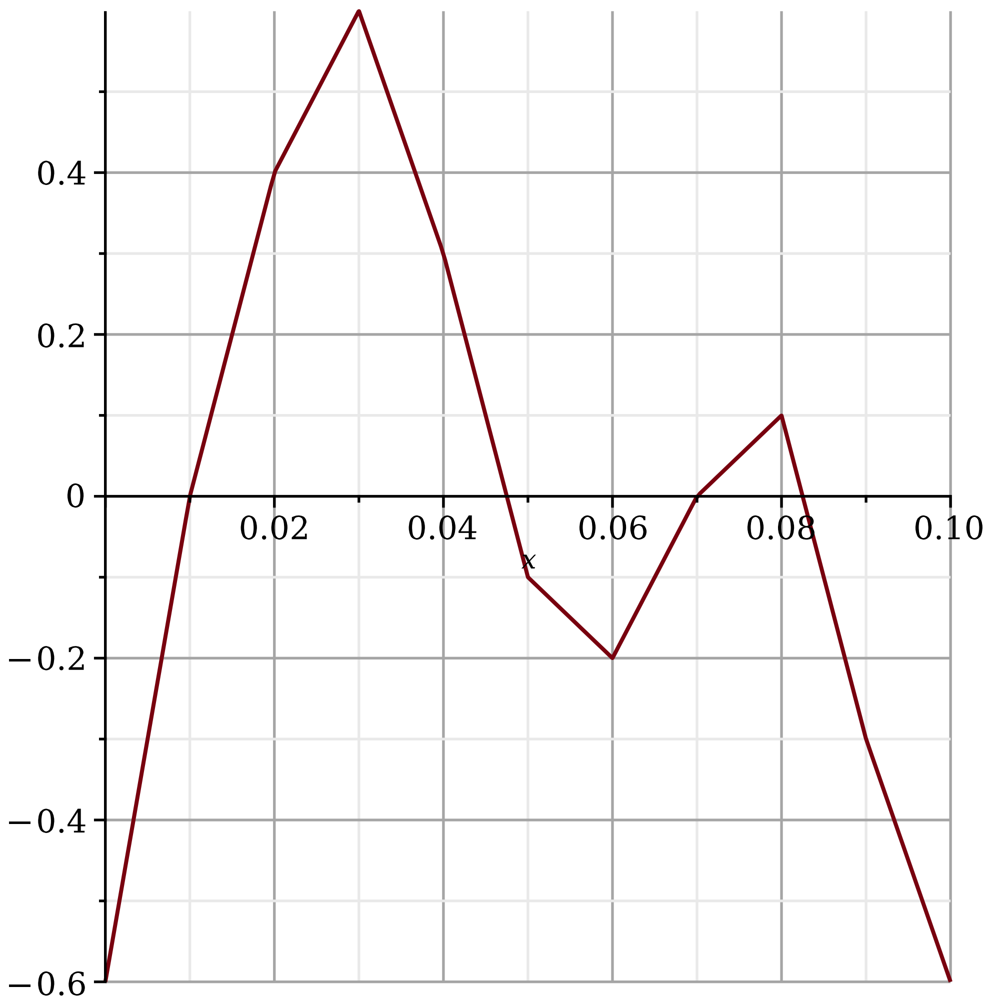



$f := LinearInterpolation(Times, Amplitudes)$

$$f := \left[\begin{array}{c} a\ linear\ interpolation\ object \\ with\ 11\ points\ in\ 1\text{-}D \end{array}\right] \quad (1)$$

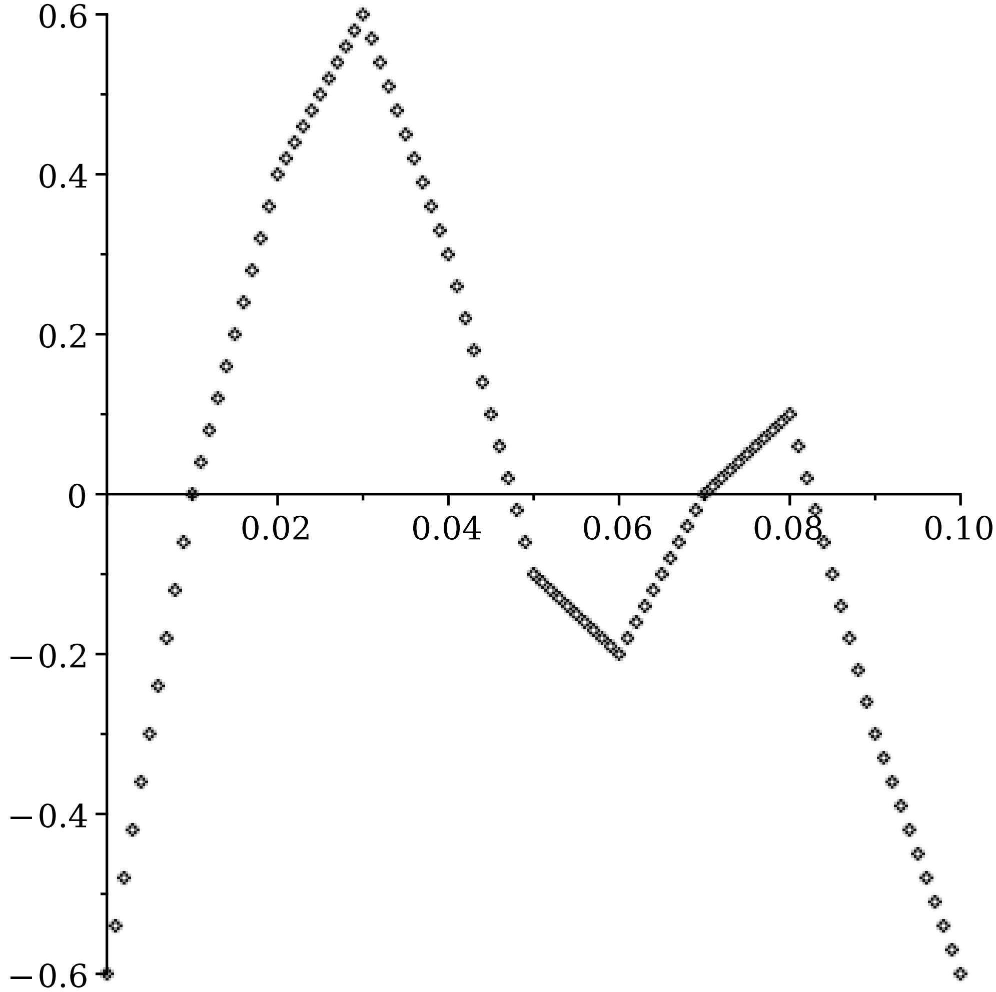
$f(0.033) = 0.510000000000000$

$plot(f(x), x = 0. .. 0.1, gridlines)$



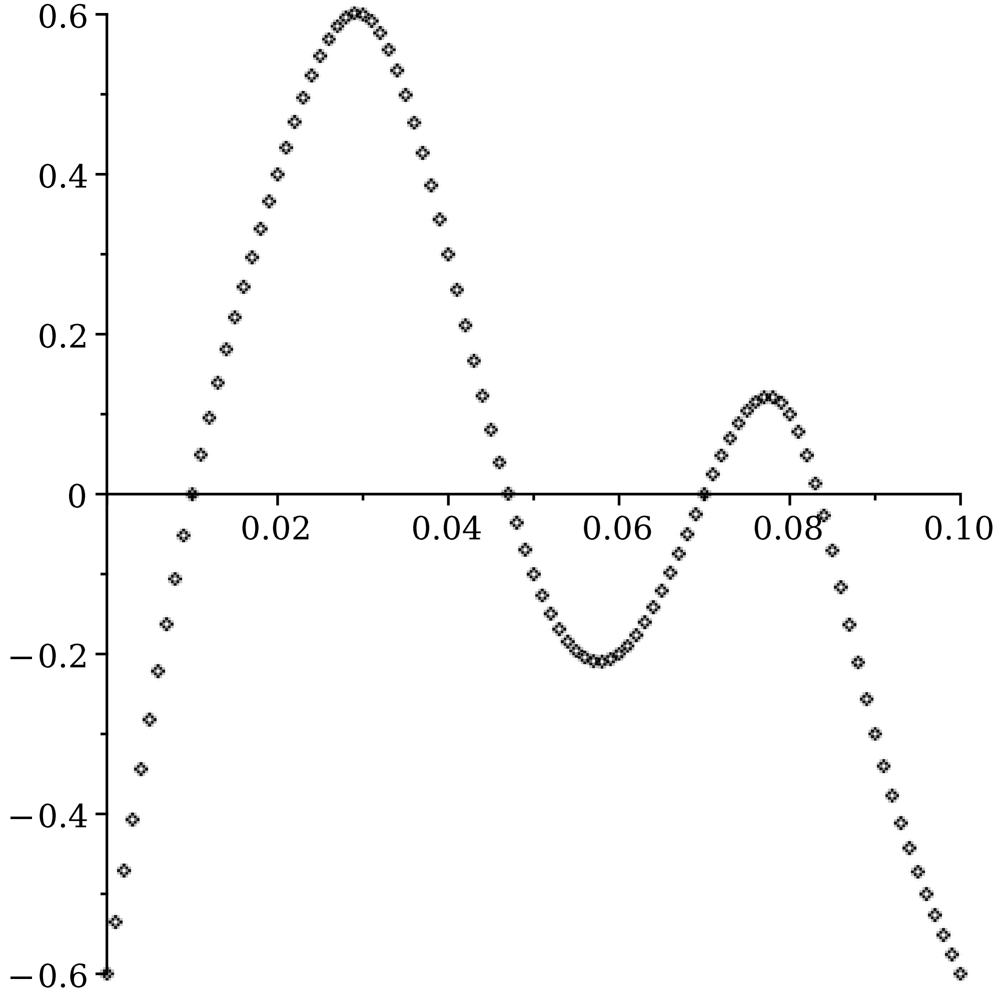

$NewTimes := [seq(0.001*i, i = 0 .. 100)] :$
$NewAmplitudes := f(NewTimes) :$

$pointplot(NewTimes, NewAmplitudes)$

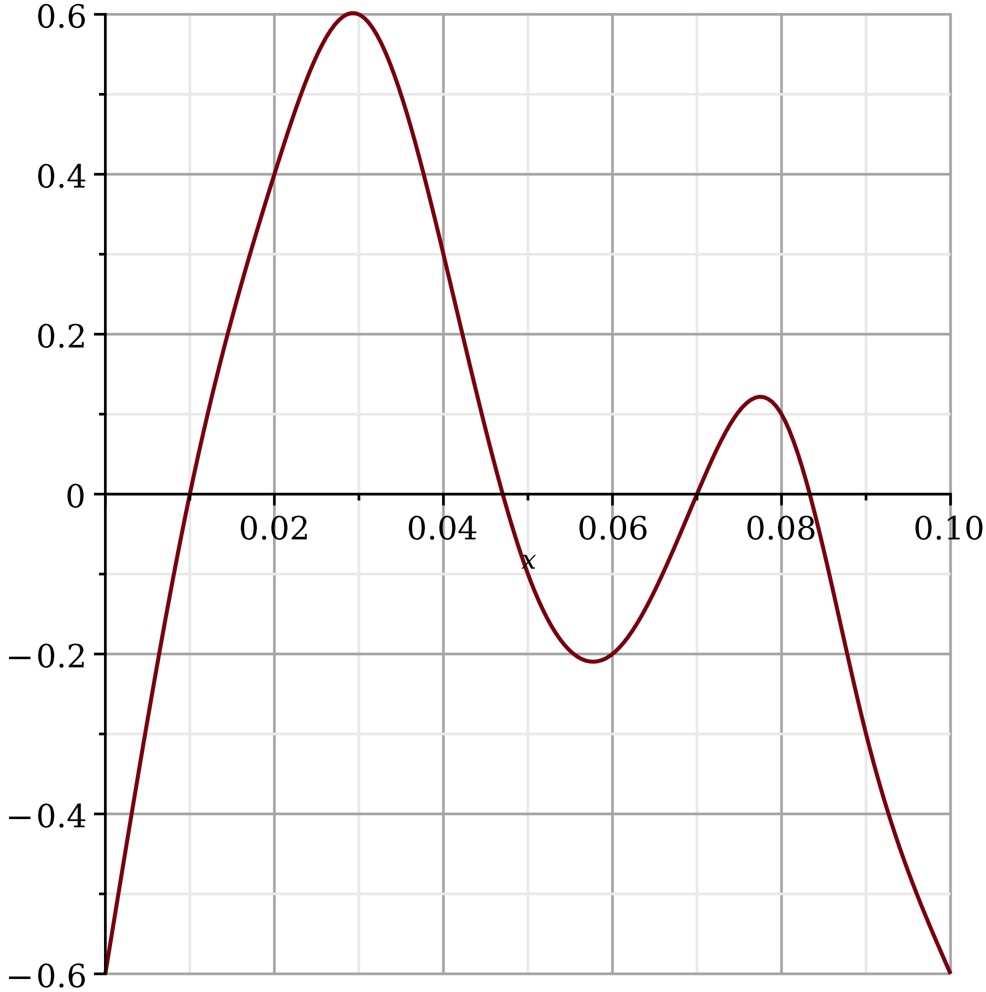



$NewAmplitudes := f(NewTimes, 'method' = 'spline') :$

$pointplot(NewTimes, NewAmplitudes)$

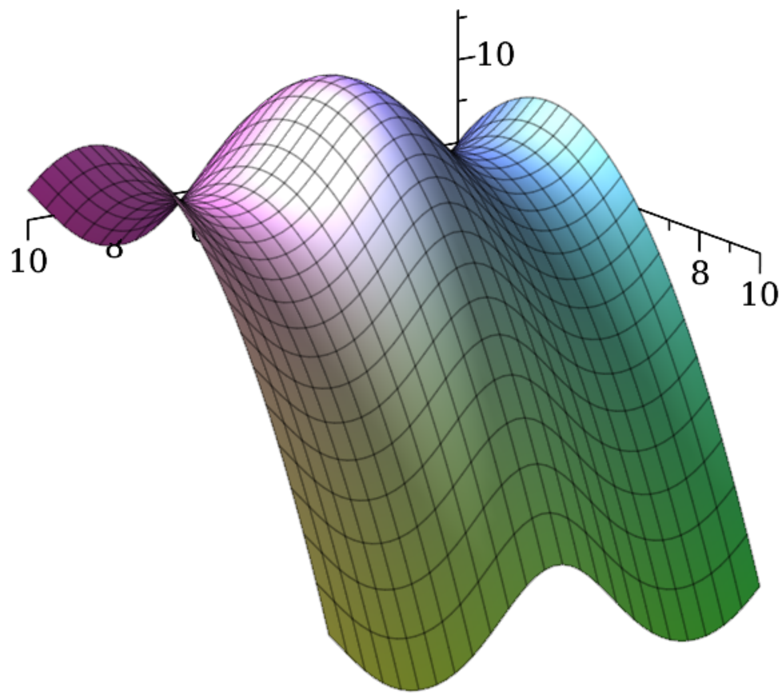



$plot(f(x, 'method' = 'spline'), x = 0.\,..\,0.1,\ gridlines)$



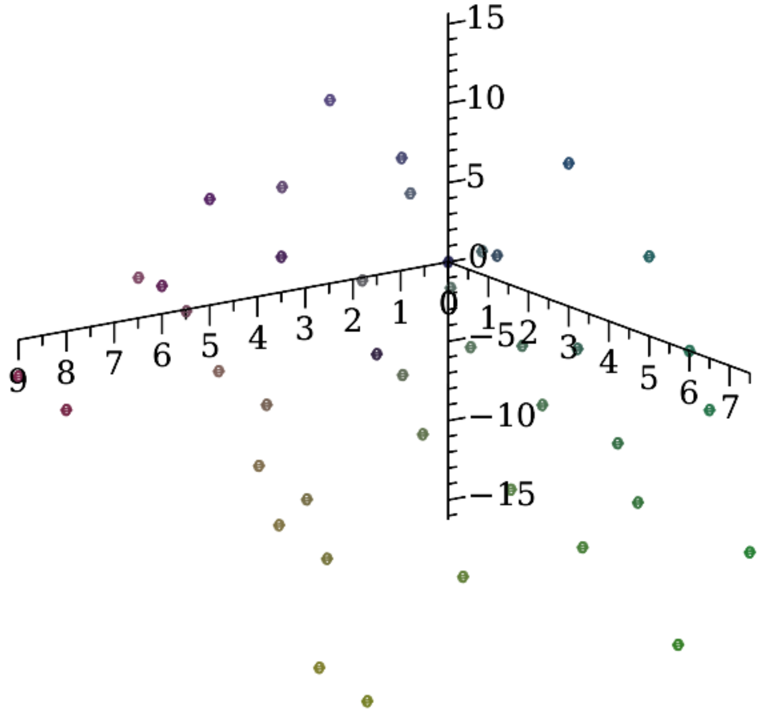

$f := (i, j) \to (3 - \sin(i))^2 - (3 - j)^2 :$

$plot3d(f, 0 .. 10, 0 .. 10, axes = normal)$




$v := Array([0, 1.5, 3.5, 5, 6, 8, 9]) :$
$w := Array([0, 3, 5, 6, 6.5, 7.5]) :$
$y := Matrix(7, 6, (a, b) \rightarrow evalf(f(v[a], w[b]))) :$

$pointplot3d([seq(seq([v[i], w[j], y[i, j]], j = 1 .. 6), i = 1 .. 7)], axes = normal, symbol = sphere)$




$a1 := Matrix(50, 50, (i, j) \rightarrow 1/5*i)$ :
$a2 := Matrix(50, 50, (i, j) \rightarrow 1/5*j)$ :

$A := ArrayTools[Concatenate](3, a1, a2)$ :

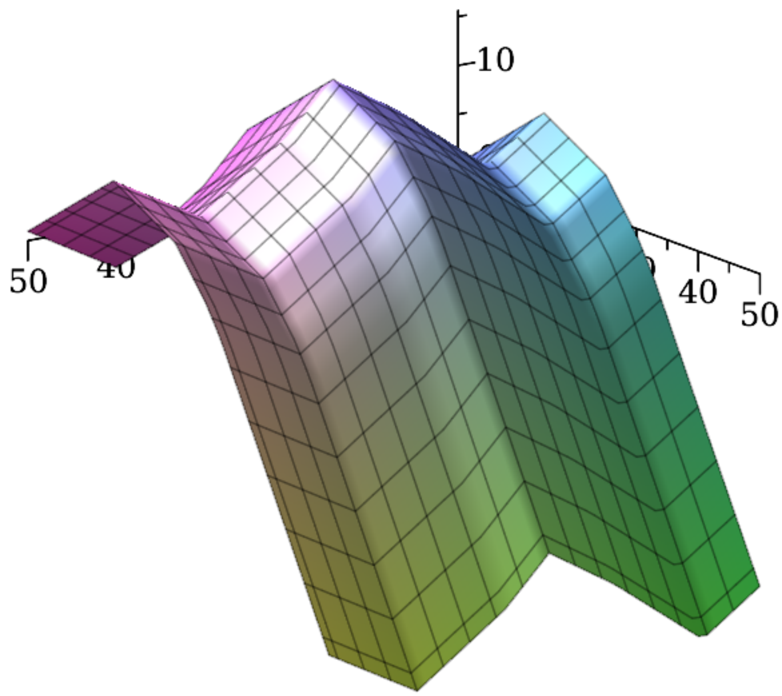
$f := LinearInterpolation([v, w], y)$

$$f := \left[\begin{array}{c} \text{a linear interpolation object} \\ \text{with an 7x6-point grid} \end{array}\right] \tag{2}$$

$B := f(A)$

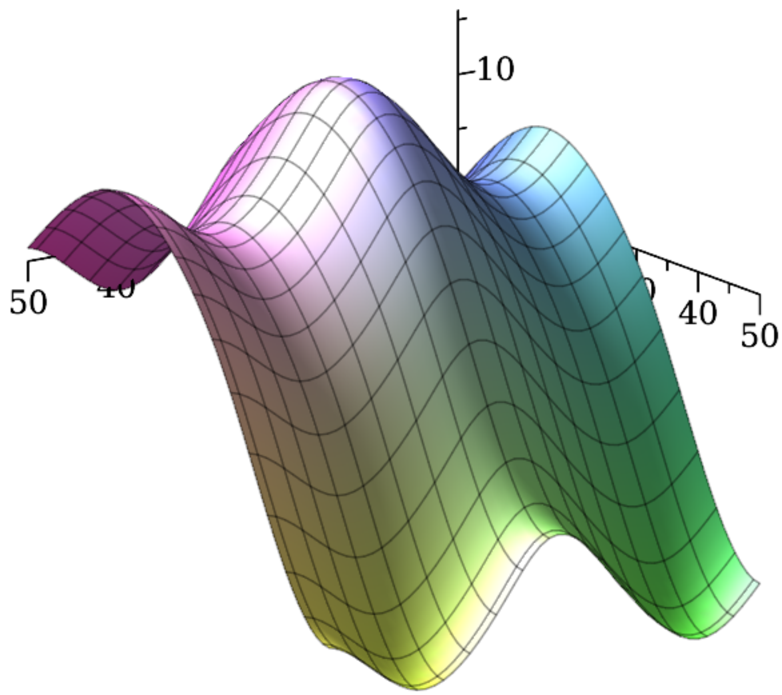
$$B := \begin{bmatrix} -0.0653298230666667 & 0.534670176933333 & 1.13467017693333 & 1.73467017693 \\ -0.730659646133333 & -0.130659646133333 & 0.469340353866667 & 1.06934035386 \\ -1.39598946920000 & -0.795989469200000 & -0.195989469200000 & 0.40401053080 \\ -2.06131929226667 & -1.46131929226667 & -0.861319292266667 & -0.26131929226 \\ -2.72664911533333 & -2.12664911533333 & -1.52664911533333 & -0.92664911533 \\ -3.39197893840000 & -2.79197893840000 & -2.19197893840000 & -1.5919789384 \\ -4.05730876146667 & -3.45730876146667 & -2.85730876146667 & -2.2573087614 \\ -4.02908757735000 & -3.42908757735000 & -2.82908757735000 & -2.2290875773 \\ -3.30731538605000 & -2.70731538605000 & -2.10731538605000 & -1.5073153860 \\ -2.58554319475000 & -1.98554319475000 & -1.38554319475000 & -0.7855431947 \\ \vdots & \vdots & \vdots & \vdots \end{bmatrix}$$

$matrixplot(Matrix(B), axes = normal)$

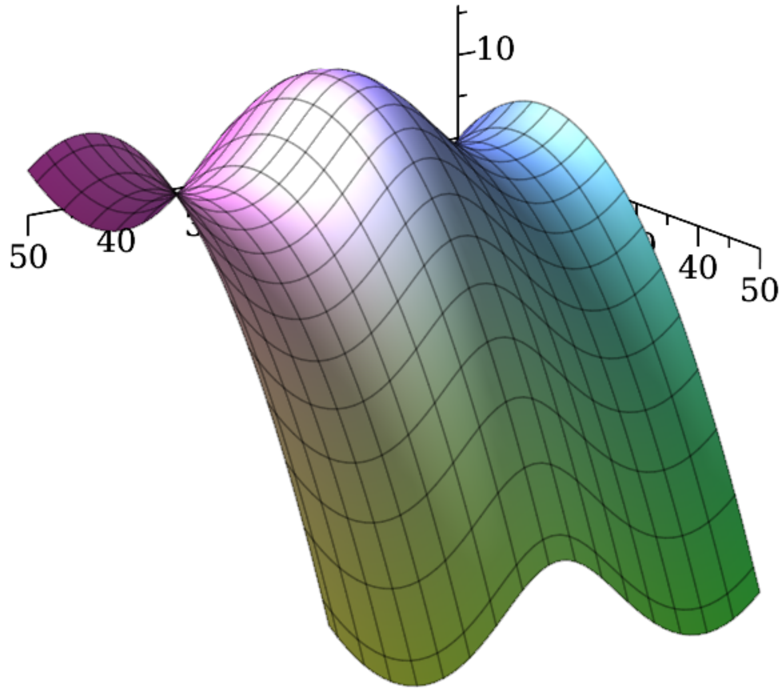



$B := f(A, method = spline) :$

$matrixplot(Matrix(B), axes = normal)$




$B := f(A, method = spline, degree = 5) :$
$matrixplot(Matrix(B), axes = normal)$



10
50
40
40
50