

$$\frac{\partial^2 V}{\partial x^2} + \frac{\partial^2 V}{\partial y^2} \rightarrow$$

Diagram illustrating the discretization of a 2D potential energy landscape $V(x, y)$ on a grid of size $N \times N$ with spacing h .

The potential energy at a grid point (i, j) is approximated by the average of its four nearest neighbors:

$$V(i, j) = \frac{1}{4} [V(i+1, j) + V(i-1, j) + V(i, j+1) + V(i, j-1)] + \frac{\rho(i, j)}{h^2}$$

The potential energy matrix V_0 is transformed into the source term V_s (labeled (1)) via the transformation:

$$V_0 \rightarrow V_s = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

The transformation is indicated by a red arrow labeled k .

- Definir variabel $\epsilon = 1e^{-8}$
 - Definier counter itemcount $k = 0$
 - Defin variable error = 10
- Initialisierung
 $V_{temp} = zeros(M, N)$

while $k \leq 1e^4$ and $\text{error} > \text{epsilon}$

$$\text{error} = 0$$

for i in range $(1, N-1)$

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for i in range(1, N-1)
    for j in range(1, N-1)
         $\sqrt{[i, j]} = \dots$ 
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- Define initial $\epsilon = 1e^{-8}$
 - Define initial iteration $k = 0$
 - Define variable $error = 10$
- Initialization
 $V_{temp} = zeros(N, N)$

while $k \leq 1e^4$ and $error > \epsilon$

$error = 0$

for i in range $(1, N-1)$

for j in range $(1, N-1)$
 $V[i, j] = \dots$ V_{temp}
 $error += V[i, j] - V_{temp}[i, j]$

$error = error / N^2$