In a nutshell: Gradient descent

Given a continuous and differentiable real-valued function f of a vector variable with one initial approximation of a minimum $\mathbf{u}_0$, gradient descent converts the problem of approximating a solution in n dimensions to approximating the solution in one dimension, one step at a time.

Parameters:

$\varepsilon_{\text{step}}$	The maximum error in the value of the minimum cannot exceed this value.
ε_{abs}	The difference in the value of the function after successive steps cannot exceed this value.
N	The maximum number of iterations.

1. Let $k \leftarrow 0$.
2. If $k > N$, we have iterated N times, so stop and return signalling a failure to converge.
3. Calculate $\nabla f(\mathbf{u}_k)$ and define a function $f(\mathbf{u}_k - \alpha \nabla f(\mathbf{u}_k))$. This is a real-valued function of a real variable α, so use an algorithm to find a minimum in the direction of $-\nabla f(\mathbf{u}_k)$. Let this minimum be $\alpha_k > 0$.
4. Set $\mathbf{u}_{k+1} \leftarrow \mathbf{u}_k - \alpha_k \nabla f(\mathbf{u}_k)$.
5. If $\|\mathbf{u}_{k+1} - \mathbf{u}_k\|_2 < \varepsilon_{\text{step}}$ and $|f(\mathbf{u}_{k+1}) - f(\mathbf{u}_k)| < \varepsilon_{\text{abs}}$, return $\mathbf{x}_{k+1}$.
6. Return to Step 2.