

Gradient-based optimizers:

Optimizers to find the optimal variational parameters can be of various types. One of the types is gradient-based optimizers, where a parameter 'A' (dependent on gradient of the cost function and some other hyperparameters) is used to iterate to the next variational parameter value from the previous value.

All gradient-based optimizers follow the same variational parameter iteration formula given below, except the formula of A is unique to the algorithm type.

$$\vec{\gamma}^{(k+1)} = \vec{\gamma}^{(k)} - A(\vec{\nabla} f(\vec{\gamma}^{(k)}), \dots)$$

Where $\nabla f(\gamma(k))$ is the gradient (Note: due to the analytical form of the cost function not being known, approximation is made to find the gradient.)

Some of the gradient-based optimizers are:

- Gradient Descent
- Quantum Natural Gradient descent
- Root Mean Squared Propagation
- Newton's Method