GP Algorithm

Step 1: Construct $\mathbf{y}$

$$\mathbf{y} = \begin{pmatrix} \vec{y}_{domain} \\ g(x^{\partial\Omega}_{1:M_{\partial\Omega}}) \end{pmatrix} \tag{1}$$

Step 2: Solve γ

$$\big(DF(\vec{z}^k)K(\phi,\phi)(DF(\vec{z}^k))^T\big)\gamma = \mathbf{y} - F(\vec{z}^k) + DF(\vec{z}^k)\vec{z}^k. \tag{2}$$

Step 3: Compute $\vec{z}^{k+1}$

$$\vec{z}^{k+1} = K(\phi,\phi)(DF(\vec{z}^k))^T\gamma \tag{3}$$

Step 5: Return the solution

$$u(x) = \vec{z}_{1:M_\Omega} \tag{4}$$