$$df(t, \mathbf{X}_t) = \left\{ \frac{\partial f}{\partial t} + \left(\nabla_{\mathbf{X}} f\right)^T \mu_t + \frac{1}{2} \mathrm{Tr} \left[\mathbf{G}_t^T \left(H_{\mathbf{X}} f \right) \mathbf{G}_t \right] \right\} dt + \left(\nabla_{\mathbf{X}} f\right)^T \mathbf{G}_t d\mathbf{B}_t$$

$$\left[\begin{array}{cc} \mathbf{I} & -\mathbf{Z}_{FF}^{(k)} \mathbf{M}_{FC} \\ \mathbf{0} & \mathbf{I} \end{array} \right] \left[\begin{array}{cc} \mathbf{Z}_{FF}^{(k)} & \mathbf{0} \\ \mathbf{0} & \mathrm{Sc}(\mathbf{M}, F)^{-1} \end{array} \right] \left[\begin{array}{cc} \mathbf{I} & \mathbf{0} \\ -\mathbf{M}_{CF} \mathbf{Z}_{FF}^{(k)} & \mathbf{0} \end{array} \right] \approx_\gamma \mathbf{M}^{-1}$$

$$R(X,Y)Z = \nabla_X \nabla_Y Z - \nabla_Y \nabla_X Z - \nabla_{[X,Y]} Z$$

$$P^\perp \nabla \ell_\mu(y) = \left(\Pi - \frac{y_{st} y_{st}^T}{\|y_{st}\|_2^2} \right) \nabla \ell_\mu(y)$$

$$\phi(G) = O(k) \frac{\lambda_2}{\sqrt{\lambda_k}}$$

$$\max_{w_i \geq 0} \log \det \left(\mathbf{A}^T \mathbf{W} \mathbf{A} \right) - \frac{n}{m} \sum_{i=1}^{m} w_i \log w_i$$