$$\mathbb{E}\left[\, g^{\cancel{tt}}(t)\ \nabla g(t)^T \right]_{\cancel{gj}\, j}$$

~~tan vector~~

matrix

$$(\nabla g)_{ij} = \frac{\partial g_i}{\partial g_j}$$

i.e. $= \mathbb{E}\left[\sum g_i \frac{\partial g_i}{\partial g_j}\right] = 0$?

$\frac{\partial g_i}{\partial}$

Yes holds!

$\nabla g : \mathbb{R}^n \to \mathbb{R}^n$

$$g^T(s) = g^T(t) + \cancel{\nabla g^T (t-s)}$$
$$\cancel{(t-s)}\,\nabla g^T$$

$$g \left(\; \right)\left(\; \right) \left((g)^{\cancel{(t-s)}^T} \left(\nabla g \right) \right)_{\cancel{g}\, ij}$$

$$= \cancel{\sum g_i (t_j - s_i)} \qquad \nabla^2 g$$

$$= \sum_k \left(g(t-s)\right)_{ik} \nabla g_{kj}$$

$$= \sum_k g_i (t-s)_k \cdot \nabla g_{kj}$$

$$= \sum_k (t_k - s_k)\ \cancel{\partial g}\ g_i \frac{\partial g_k}{\cancel{\partial g_j}}$$