$\mathbb{E}[\nabla f(t)]$ $\mathbb{E}[\nabla f(t)(\nabla f(t))^T] = I$

$\Rightarrow \mathbb{E}[(\nabla^2 f(t))(\nabla f(t))^T$

$+ \mathbb{E}[\nabla f(t)(\nabla^2 f(t))^T] = 0$

$\mathbb{E}AB^T$

equal??

$\mathbb{E}[f(t)^2] = c$

$\Rightarrow \mathbb{E}[2\nabla f(t) f(t)] = 0$

$\Rightarrow \mathbb{E}[2\nabla^2 f(t) f(t)] + 2\mathbb{E}[\nabla f(t)^T \nabla f(t)] = 0$

$= cov(\nabla f(t))$

transpose first as
∇f is a row vector!

$cov(\nabla f(t)) = \mathbb{E}[\nabla^T f(t) \nabla f(t)]$

$cov(\nabla f(t)) := cov(\nabla^T f(t))$