

$$\begin{pmatrix} 1 & \rho(s,t) & \rho(t,r) \\ \rho(s,t) & 1 & \rho(s,r) \\ \rho(t,r) & \rho(s,r) & 1 \end{pmatrix}$$

$$\det = 1(1 - \rho(s,r)^2)$$

assume  $\rho$  symmetric for ease!

$$- \rho(s,t) (\rho(t,s) - \rho(s,r)\rho(t,r))$$

$$+ \rho(t,r) (\rho(s,t)\rho(s,r) - \rho(t,r))$$

$$= 1 - \rho(s,r)^2 - \rho(s,t)^2 - \rho(t,r)^2 + 2\rho(t,r)\rho(s,r)$$

$$1 - (1 - \nabla \rho \left( \frac{s-t}{t-t_0} \right))^2$$

$$2 \left( 1 + \nabla \rho \left( \frac{s-t}{t-t_0} \right) \right) \left( 1 + \nabla \rho \left( \frac{s-t}{t-t_0} \right) \right)$$

$$= -1 + 2 \left( \nabla \rho \left( \frac{s-t}{t-t_0} \right) \right)$$

$$2 \nabla \rho$$

$$= -1 - 2 \nabla \rho \left( \frac{s-t}{t-t_0} \right) + \dots$$