$$\det \text{cov}\left(f'(t),\ f''(t) + |s-t|^{\eta} z'_{t,s},\ f'''(t) + f''''(t)(r-t) + |r-t|^{1+\eta} z^2_{t,s} \right)$$

$$= \det \text{cov}\left(f'(t),\ f''(t) + |s-t|^{\eta} z'_{t,s},\right.$$
$$\left. f'''(t)(r-t) + |r-t|^{1+\eta} z^2_{t,s} - |s-t|^{\eta} z'_{t,s} \right)$$

$$= \det(A + K)$$

$$A = \text{cov}\left(f'(t),\ f''(t) + |s-t|^{\eta} z'_{t,s},\ f'''(t)(r-t) + |r-t|^{1+\eta} z^2_{t,s} \right)$$

$$\ell \quad K = \begin{vmatrix} 0 & 0 & |s-t|^{2} \text{cov}(f'(t), z'_{t,s}) \\ 0 & |s-t|^{2\eta} \text{cov}(z'_{t,s}) & |s-t|^{2\eta} \text{cov}(z'_{t,s}) + \text{cov}(f', z'_{t,s}) \\ 0 & & \\ & & \text{cov}(\end{vmatrix}$$