7. (e) $p(x) = \sum_{k=0}^{n} a_k x^k$.

and; $\Omega = \Omega(a_0, a_1, \ldots, a_{n-1})$

↳ map that takes in coefficients and spits out the roots Ω_k's

$\Gamma_{k\ell} =$

Now; $(\text{cond}\ \Omega_k)(a_\ell) = \left\| \dfrac{a_\ell\ \partial\Omega_k / \partial a_\ell}{\Omega_k} \right\|$

Now: $\dfrac{\partial \Omega_k(a_\ell)}{\partial a_\ell} = ?$

Now; ~~Ω_k~~ we can think of the polynomial as a fn of Ω_k's as the Ω_k's depend on a_ℓ's.

so; $\dfrac{\partial \Omega_k}{\partial a_\ell} \equiv \dfrac{\partial \Omega_k}{\partial p(\Omega_k)} \dfrac{\partial p(a_\ell)}{\partial a_\ell}$

so. p's are fn of Ω_k and a_ℓ as they are themselves related through the Ω map.

Let; $\dfrac{\partial p(\Omega_k)}{\partial \Omega_k} = p'(\Omega_k)$

and $\left.\dfrac{\partial p}{\partial a_\ell}\right|_{\Omega_k} = x_k^\ell$.

so. $\Gamma_{k\ell} = \left\| a_\ell\ \dfrac{x_k^\ell}{p'(\Omega_k)} \times \dfrac{1}{\Omega_k} \right\|$

Now; $\Omega_k = x_k$. (they are the ~~root~~ k^{th} roots)

so; $\Gamma_{k\ell} = \left\| \dfrac{a_\ell\ \Omega_k^{\ell-1}}{p'(\Omega_k)} \right\|_1 \longrightarrow \Gamma_k = \sum_{\ell=0}^{n-1} \dfrac{a_\ell \Omega_k^{\ell-1}}{p'(\Omega_k)}$.

$$\boxed{\text{so; } (\text{cond}\ \Omega_k)(\vec{a}) = \frac{1}{p'(\Omega_k)} \sum_{\ell=0}^{n-1} a_\ell \Omega_k^{\ell-1}}$$