1116-49-2082 **Julia Eaton*** (jreaton@uw.edu), SIAS, UWT, 1900 Commerce Street, Box 358436, Tacoma, WA 98402, and **James V Burke**. *A chain rule for spectral functions.* Preliminary report.

Spectral functions are functions of the form $\psi := H \circ \Lambda$, where $H : \mathbb{C}^n \to \mathbb{R}$ is permutation invariant and $\Lambda : \mathbb{C}^{n\times n} \to \mathbb{C}^n$ takes a matrix to its vector of eigenvalues. If H returns the maximum of the real parts of its argument we recover spectral abscissa. If H returns the maximum modulus of its arguments we recover the spectral radius. Spectral functions can be viewed through polynomial root functions. Let $\Phi : \mathbb{C}^{n\times n} \to \mathcal{P}^n$ take a matrix to its characteristic polynomial, where $\mathcal{P}^n$ denotes degree n polynomials, let $\zeta : \mathcal{P}^n \to \mathbb{C}^n$ take a degree n polynomial to its vector of roots, and let $\mathfrak{h} : \mathcal{P}^n \to \mathbb{R}$ be given by $\mathfrak{h} := H \circ \zeta$. Then there is a one-to-one correspondence between spectral functions ψ and polynomial root functions $\mathfrak{h}$. An eigenvalue is nonderogatory if its geometric multiplicity is one. By applying a subdifferential chain rule formula, we formalize a long-standing intuition that nonderogatory matrices behave like polynomials, at least from a variational perspective. (Received September 21, 2015)