



AN INVERSE PROBLEM FOR THE SEMI-CLASSICAL RESONANCES GENERATED BY A CRITICAL POINT OF THE POTENTIAL

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We consider semi-classical Schrödinger operator $P(h) = -h^2\Delta + V(x)$ in \mathbb{R}^n such that the analytic potential V has a non-degenerate critical point $x_0 = 0$ with critical value E_0 and we can define resonances in some fixed neighbourhood of E_0 when $h > 0$ is small enough. If the eigenvalues of the Hessian are non-resonant the resonances in h^δ -neighbourhood of E_0 ($\delta > 0$) can be calculated explicitly as the eigenvalues of the semi-classical Birkhoff normal form.

Assuming that potential is symmetric with respect to reflections about the coordinate axes we show that the classical Birkhoff normal form determines the Taylor series of the potential at x_0 . As a consequence, the resonances in a h^δ -neighbourhood of E_0 determine the first N terms in the Taylor series of V at x_0 .

The proof uses the recent inverse spectral results of V. Guillemin and A. Uribe.