

ON FINITE QUANTUM OSCILLATORS

*V.A. Groza, I.I. Kachuryk*¹

National Aviation University
(1, Komarova Ave., Kyiv 03058, Ukraine;
e-mail: valentina.groza@bigmir.net),

¹Khmel'nyts'ky National University
(11, Instytuts'ka Str., Khmel'nyts'ky 29016, Ukraine;
e-mail: kachuryk@ief.tup.km.ua)

S u m m a r y

We construct and study new models of a finite quantum oscillator satisfying the quantum mechanics relations $[H, Q] = -iP$ and $[H, P] = iQ$. These models are related to finite dimensional representations of the quantum algebra $\text{su}_q(2)$. The position and momentum operators and the Hamiltonian are elements of the algebra $\text{su}_q(2)$. The models depend on the index j of an irreducible representation of $\text{su}_q(2)$. The spectra of the position and momentum operators consist of a finite set of points (for this reason, these models are called finite). The time evolution for each of the models is evaluated explicitly. The limit $j \rightarrow 1$ leads to a Macfarlane–Biedenharn q -oscillator.