Properties of excited states of a one-dimensional gas of spin-1 Bose atoms in a magnetic field VLADIMIR YUROVSKY, School of Chemistry, Tel Aviv University — Zeeman shifts of atom energies in an inhomogeneous magnetic field depend on the spin and coordinate states of the atoms. This dependence lifts the integrability of a Yang — Gaudin one-dimensional spinor gas with zero-range interactions. Eigenstates of such a gas of Bose atoms with two spin states are analyzed here using symmetric group representations. The system has three integrable points: the ideal and Tonks-Gerardeau gases at zero and infinitely-strong interatomic interactions, respectively, and the Yang solution at the zero magnetic field (see, e.g., [1]). Approximate eigenenergies and eigenfunctions are evaluated in the vicinity of each of the integrable points. Applicability ranges of corresponding approximations are estimated in dependence of the number of atoms.

[1] V. A. Yurovsky, M. Olshanii, and D. S. Weiss, Adv. At. Mol. Opt. Phys. **55**, 61 (2008).

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