Determination of Force Constants of Planar XY$_3$ and Tetrahedral XY$_4$ Molecules by the GF Matrix Method

Vesile G"uc"lu and Fatih Ucun

Department of Physics, Faculty of Arts and Sciences, Suleyman Demirel University, Isparta, Turkey

Reprint requests to Dr. F. U.; Fax: +90-246-2371106; E-mail: fucun@fef.sdu.edu.tr

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The force constants of the internal coordinates of planar XY$_3$ and tetrahedral XY$_4$ molecules were calculated using the GF matrix method. The matrix solutions were carried out by means of a computer program built relative to the Newton-Raphson method, and the calculations were listed in tables. For tetrahedral XY$_4$ molecules having the same Y atom it was found that the force constants decrease with the increasing mass of the X atom, and this was attributed to the slowing of the molecule with increasing mass of the centre X atom.

Key words: GF Matrix Method; Force Constants; XY$_3$ Molecules; XY$_4$ Molecules.