THE FORTRAT PARABOLE

- The FORTRAT PARABOLE is the graph of wave numbers of lines in a molecular spectral band versus the serial number of the successive lines.

- The fortrat parabola is helpful in visualizing the rotational structure of a vibration band.

- Frequencies of the lines in Q, P and R branches are,

$$\bar{\nu}_{P,R} = \bar{\nu}_{v',v''} + (B' + B'')m + (B' - B'')m^2$$

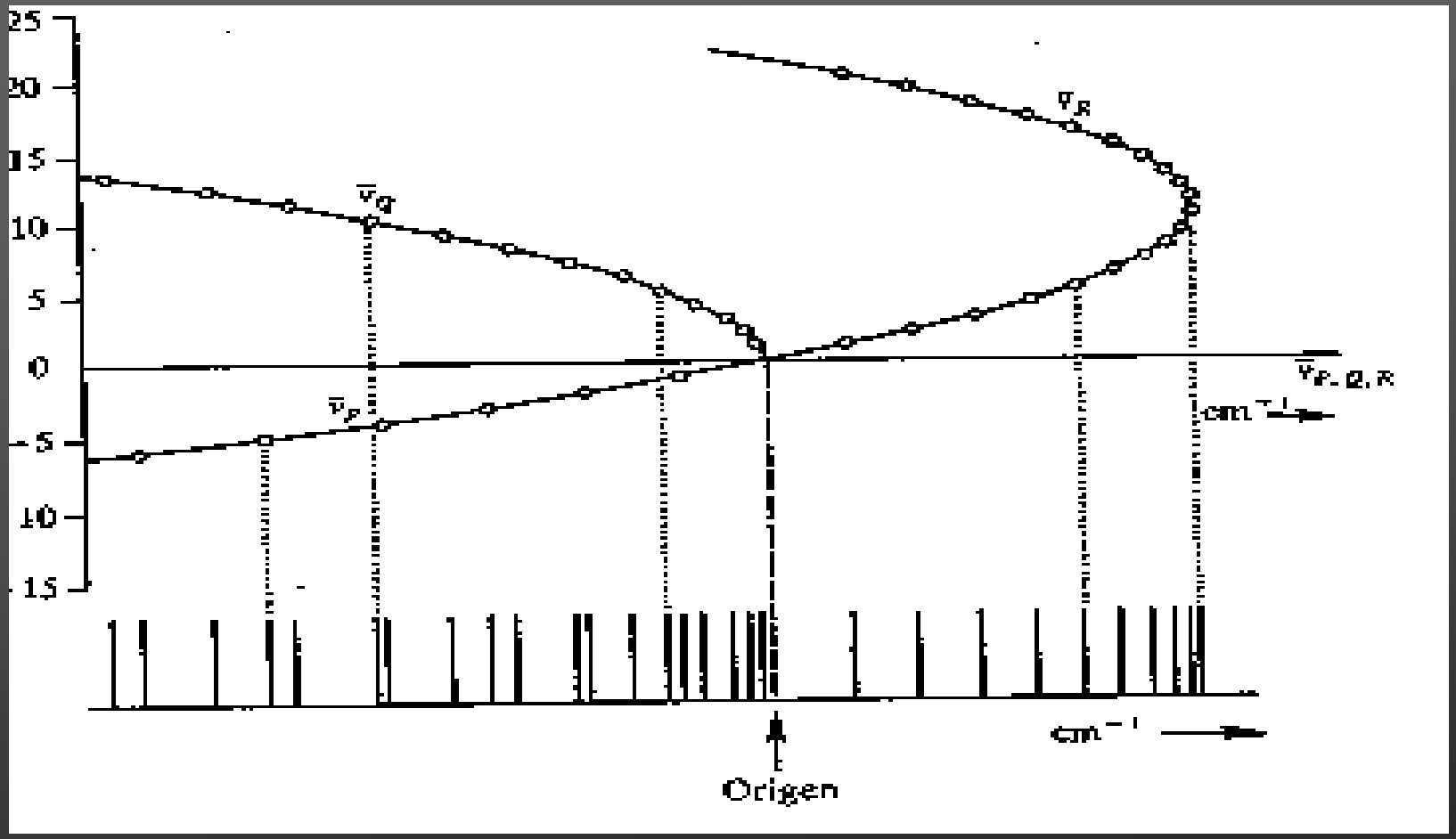
$$\bar{\nu}_Q = \bar{\nu}_{v',v''} + (B' - B'')J(J+1)$$

$$\bar{\nu}_{P,R} = \bar{\nu}_{v',v''} + (B' + B'')\mathrm{p} + (B' - B'')\mathrm{p}^2$$

$$\bar{\nu}_{Q} = \bar{\nu}_{v',v''} + (B' - B'')\mathrm{q} + (B' - B'')\mathrm{q}^2$$

‘p’ takes both positive and negative values

‘q’ takes only positive values



The fortrat parabola for B’<B” (H-band head, N-band origin)

- The right hand side is positive if B’<B”.
- The head of a band is at a higher frequency than the band origin
- The band head appears in the R branch with positive ‘p’ values.
- If B’>B” the band head occurs in the P branch with negative ‘p’ values.