



FIG. 3.1 – Arrangement of variables. T indicates scalar points where temperature, salinity, density, pressure and horizontal divergence are defined. (u, v, w) indicates vector points, and f indicates vorticity points where both relative and planetary vorticities are defined

3.1.2 Discrete Operators

Given the values of a variable q at adjacent points, the differencing and averaging operators at the midpoint between them are :

$$\delta_i[q] = q(i + 1/2) - q(i - 1/2) \tag{3.1a}$$

$$\bar{q}^i = \{q(i + 1/2) + q(i - 1/2)\} / 2 \tag{3.1b}$$

Similar operators are defined with respect to $i + 1/2, j, j + 1/2, k,$ and $k + 1/2$. Following (2.19a) and (2.19d), the gradient of a variable q defined at a T -point has its three components defined at u -, v - and w -points while its Laplacian is defined at T -point.