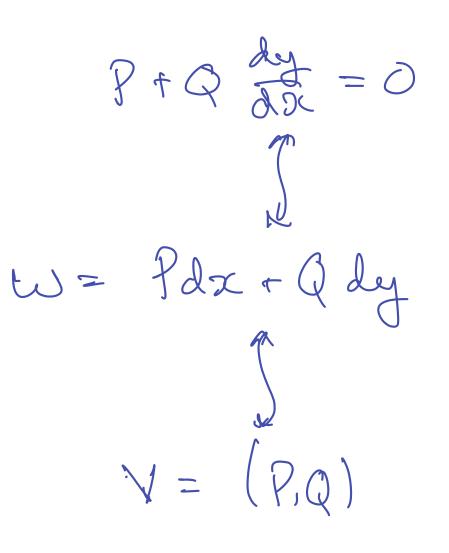
A Geometric look at exact ODES:

- P=P(x,y) Q=Q(x,y) functions
- we have the following nice dictionary:



ODE

Differ contrial Form

Vector Field.

Shart with  $P_T Q \frac{dy}{dx} = 0$ . Say year is a sol to this ODE. Recall that Since  $dy = -\frac{1}{2}r$ the slope field tells us. that at any  $x_0$ , that  $-P(x_0, y_0)$  $Q(x_0, y_0)$ i) the Slope of line tangant to y(x) at  $x_0$  ( $y_0 = y(y_0)$ ). Hence, the vector field (-Q,p) Constists & vectors that are tangent to the traje chong at ylæ).

Now, let's say that wis exact, So w=dF for some F.  $\Rightarrow$   $P = \frac{dF}{dx}$  and  $Q = \frac{dF}{dy}$ So V = (PiQ) Satisfies V = TF. In othe words, Vis orthogonal to leave Curres of F. (Recall: terrel curres are F(x,y)=C for various C) Since (-Q,P). (P,Q) =0, this Mean, the Slope field is orthogond to Vand thurefore tangent to the fevel Curres, So that y(x) must follow a trajecting along some level Curre.