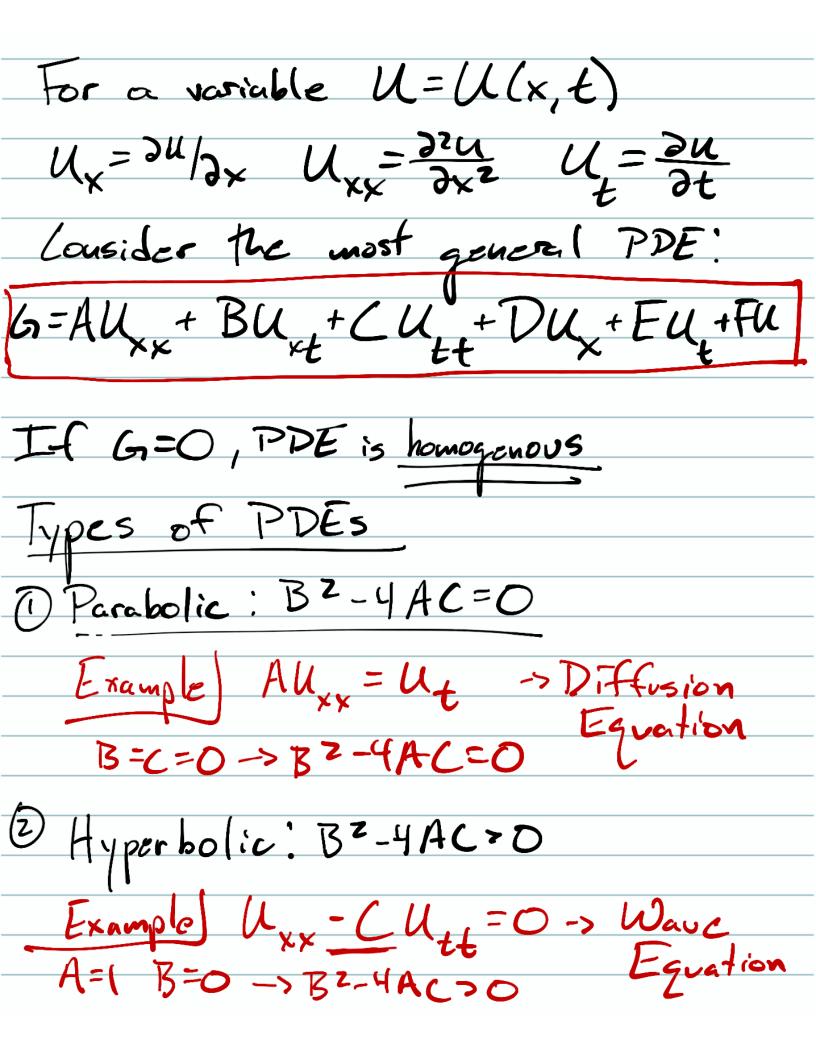
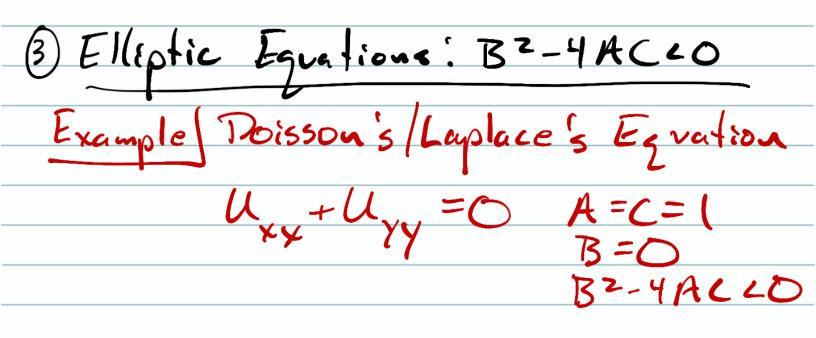
Review of PDEs
What makes ODEs ordinary is that They only involve derivatives in one variable!
$\frac{dx}{dt} = f(x,t)$ $\frac{dx}{dt} = f(x,t)$ $\frac{dx}{dt} = f(x,t)$
Partial differential equations (PDEs) involve derivatives in more than one variable: Examples For a variable T=T(x,t)
Tot = 1 Time dittusion
time derivative spatial (will return (rate of change derivative to 12.5) of I in time) (i.e. slope of
Tin spice
Remember: when you are considering derivates in multiple variables, use partial derivida

one variable because change can be caused by:
one variable because chance can be
caused by:
-> Time-dependent processes at
one location ( )
<u> </u>
-> spatially-dependent processes
-> 5 patially-dependent processes which involve change over space (327)
The relationship between these derivates,
typically in time and space, and we
con do so by combining what we learned
about solving coupled systems of ODEs
with some new tricks
Classification of PDEs
-Most PDEs of interest in Earth Gience involve Zud order derivatives.
Gience involve 2 <sup>nd</sup> order derivatives.
-> hey can generally be classified into
-> They can generally be classified into three categories, with diff non methods to solve each type
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-> Some combination of These PDES
is used in some way or another
to describe many processes in
Earth science. Is space and time-depends
-> We will extend what we have
learned about DDE numerical
methods to solve PDES using
numerical methods.