

Linearization in five steps

1. Identify a simple solution of the system of equations (typically this solution will be zonal and independent of time. We refer to this solution as the ***basic state*** solution.
2. For the system of equations, write each variable, A as
$$A = \bar{A} + A',$$
where \bar{A} is the basic state solution and A' is a perturbation to that solution. Further, we assume that $A' \ll \bar{A}$.
3. For each variable A , substitute $A = \bar{A} + A'$ into the system of equations for A .
4. Simplify the resulting systems as follows:
 - (i) All terms involving \bar{A} or products of “barred” quantities should cancel identically.
 - (ii) Quadratic or higher order terms involving perturbations should be neglected
 - (iii) Terms like $\bar{A}A'$ and $\bar{B}A'$ are retained, so that the resulting equation is linear in perturbation variables.
5. The resulting equation can be solved using “traditional” techniques.