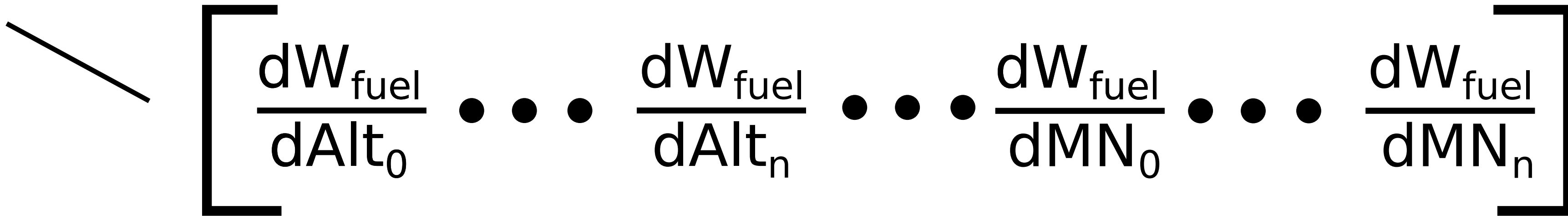


Adjoint derivatives  
compute Jacobian 1 row  
at a time


$$\left[ \frac{dW_{\text{fuel}}}{d\text{Alt}_0} \bullet \bullet \bullet \frac{dW_{\text{fuel}}}{d\text{Alt}_n} \bullet \bullet \bullet \frac{dW_{\text{fuel}}}{d\text{MN}_0} \bullet \bullet \bullet \frac{dW_{\text{fuel}}}{d\text{MN}_n} \right]$$

forward derivatives  
compute Jacobian 1  
column at a time