

Suppose $\alpha = \sum_a f_a \theta^a \wedge \theta^{a_2} \wedge \dots \wedge \theta^{a_r}$
 $\beta = \sum_b g_b \theta^b \wedge \theta^{b_2} \wedge \dots \wedge \theta^{b_s}$

$\alpha \wedge \beta = \sum_{a,b} f_a g_b \theta^a \wedge \theta^b \wedge \dots \wedge \theta^{a_r} \wedge \theta^{b_s}$

and D is linear in each case

i.e. $D(\alpha + \beta) = D(\alpha) + D(\beta)$

so we need only consider p forms
of the form $f_a dx^{a_1} \wedge dx^{a_2} \wedge \dots \wedge dx^{a_p}$