FSc 401 RDS(1)

* RDS is the most important concept in the whole of science and engineering (and in life?) ...

* Remember Physics 101: Circuits in parallel or in series!

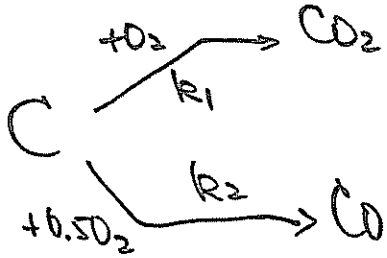
$i = \frac{V}{R_{eq}}$; $\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}$ vs. $i = \frac{V}{R_{eq}}$; $R_{eq} = R_1 + R_2$

∴ Conductances are additive! ∴ Resistances are additive!

$i = (C_1 + C_2)V$ $i = \frac{V}{R_1 + R_2}$

...analogous to...

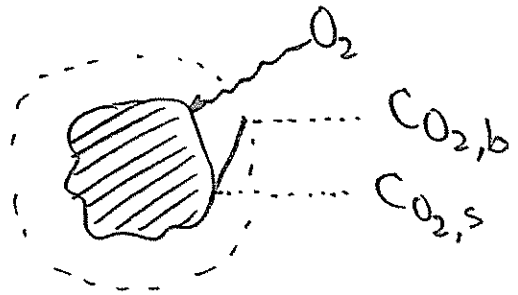
* Two parallel rxns:



$\boxed{\text{Rate} = (k_1 + k_2) C_{O_2}}$

[assuming both rxns zero order w/r to C and 1st order w/r to O_2]

* Diffusion to the surface followed by rxn on the surface:



Rate of diffusion = $k_d(C_{O_2,b} - C_{O_2,s})$

Rate of surface rxn = $k_r C_{O_2,s}$

$\therefore \boxed{\text{Rate} = \frac{C_{O_2,b}}{\frac{1}{k_r} + \frac{1}{k_d}}}$ (Show!) ...EXTRA CREDIT...