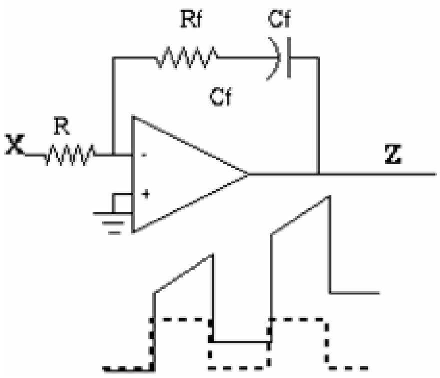
OPERACIJE Z VEZJI, KI VSEBUJEJO KONDENZATOR

1.) Integrator z ojačevalcem!



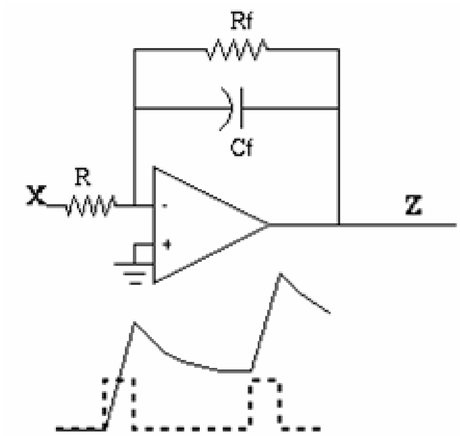
$$A \to \infty,\ Off = 0,\ I_{bias} = 0$$

$$\frac{x}{R} + \frac{z}{R_f + \frac{1}{C_f p}} = 0, \qquad p = \frac{\partial}{\partial t}$$

$$z = -\left[\frac{R_f}{R} + \frac{1}{RC_f p}\right] x$$

1.) $R_f \to 0$

2.) $RC_f \to 0$



$$A \to \infty,\ Off = 0,\ I_{bias} = 0$$

$$\frac{x}{R} + \frac{z}{R_f} + \frac{z}{\frac{1}{C_f p}} = 0, \qquad p = \frac{\partial}{\partial t}$$

$$z + R_f C_f pz + \frac{R_f}{R} x = 0$$

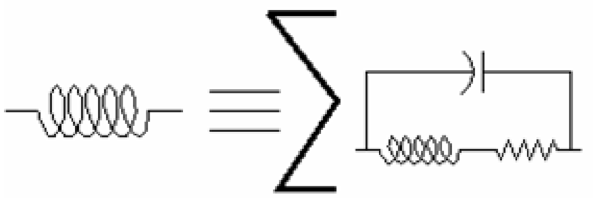
$$(1 + R_f C_f p) z + \frac{R_f}{R} x = 0$$

$$z = -\frac{R_f}{R} \frac{1}{(1 + R_f C_f p)} x$$

1.) $R_f \to 0$

2.) $R_f C_f \to 0$

Tuljave!

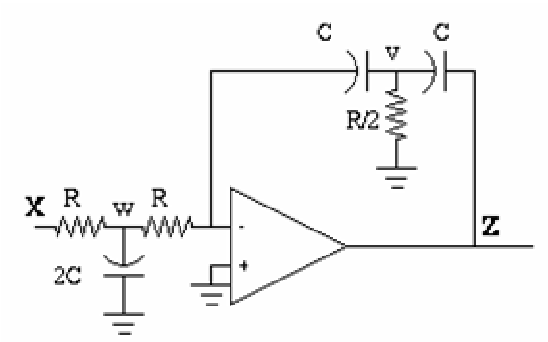


Tuljavam se izogibamo, ker so dejansko bolj komplicirano vezje:

- žice navitja so kapacitativno sklopljene (reda pF/cm)
- žice tuljav predstavljajo omski upor

Pride do nihanj, resonanc, izgub zaradi gretja jedra itd. Izkaže se, da se da v veliko primerih tuljavam ogniti. U=Lp I, se da nadomestiti z povratno zanko in kondenzatorjem.

2.)Dvojni integral lahko realiziramo kot dvojni integrator (glej zgoraj) ali kot sledeče vezje.



$$A \to \infty,\ Off = 0,\ I_{bias} = 0$$

$$\frac{x-w}{R} + \frac{-w}{\frac{1}{2Cp}} + \frac{-w}{R} = 0$$

$$\frac{z-v}{\frac{1}{Cp}} + \frac{-v}{\frac{R}{2}} + \frac{-v}{\frac{1}{Cp}} = 0$$

$$\frac{w}{R} + \frac{v}{\frac{1}{Cp}} = 0 \to w = -RCpv$$

$$x + 2RCp(RCp)v + 2RCpv = 0$$

$$Cpz - (2Cp + \frac{2}{R})v = 0$$

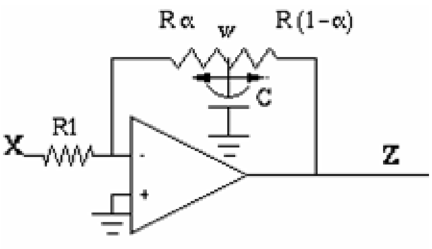
$$Cpz + \frac{(2Cp + \frac{2}{R})}{(2RCp(RCp) + 2RCp)} = 0$$

$$RCpz + \frac{2(RCp + 1)}{2RCp(RCp + 1)} = 0$$

$$z = -\frac{1}{(RCp)^2}x$$

Če je vhodna funkcija konstanta je izhod kvadratno naraščujoča napetost.

3.) Vezje je odvajalnik in ojačevalnik. Kako se spreminja glede na delež upora v povratni zanki.



$$\frac{x}{R_1} + \frac{w}{R\alpha} = 0 \to w = -\frac{R\alpha}{R_1}x$$

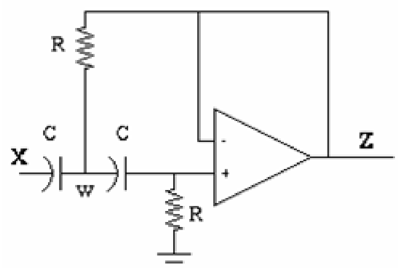
$$\frac{-w}{R\alpha} + \frac{w}{\frac{1}{Cp}} + \frac{z-w}{(1-\alpha)R} = 0$$

$$-w\left[\frac{1}{R\alpha} + Cp + \frac{1}{(1-\alpha)R}\right] + \frac{z}{(1-\alpha)R} = 0$$

$$\left[(1-\alpha)\frac{R}{R_1} + \frac{\alpha(1-\alpha)R^2Cp}{R_1} + \alpha\frac{R}{R_1}\right]x + z = 0$$

$$z = \left[\frac{\alpha(\alpha-1)R^2Cp}{R_1} - \frac{R}{R_1}\right]x$$

4.) Izračunajmo odgovor vezja.



$$Cp(x-w) + \frac{z-w}{R} + Cp(z-w) = 0$$

$$RCp(x-w) + z + RCp(z-w) = 0$$

$$\frac{-z}{R} + Cp(w-z) = 0 \to w = \frac{1+RCp}{RCp}z$$

$$RCpx + (1+RCp)z - (2RCp+1)w = 0$$

$$RCpx + (1+RCp)z - \frac{(2RCp+1)(1+RCp)}{RCp}z = 0$$

$$\left[(1+RCp) - \frac{(2RCp+1)(1+RCp)}{RCp}\right]z = -RCpx$$

$$z = \frac{RCp}{\left[\frac{(2RCp+1)(1+RCp)}{RCp} - (1+RCp)\right]}x$$