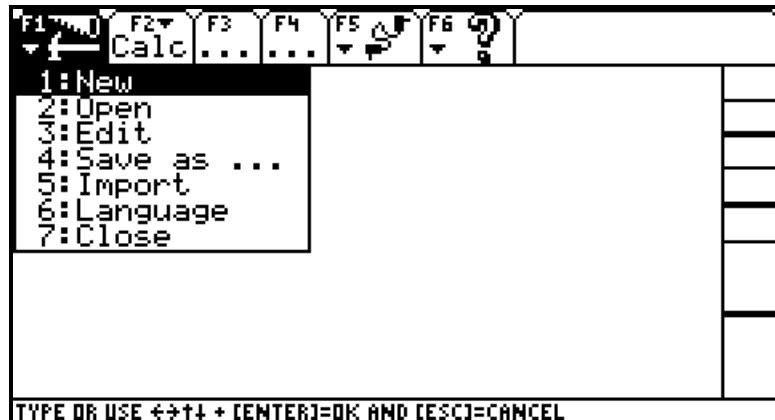


TiSpice 4.1

With this program it is to be executed possible a complete current - voltage calculation in an electrical network. Additionally the transfer function or the frequency response for a four-pole network can be created.

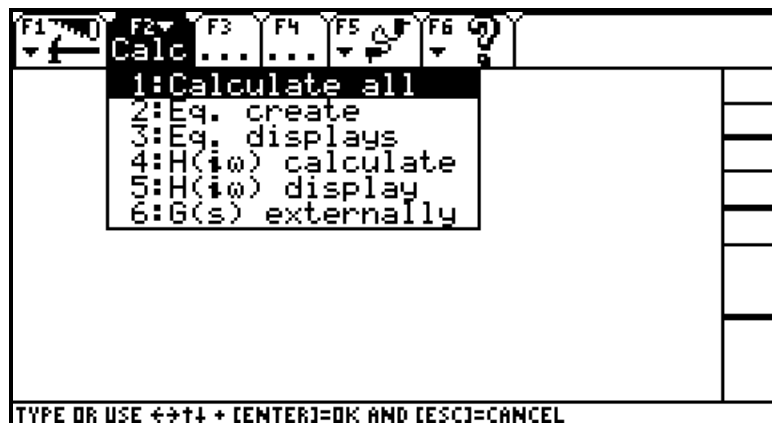
1. Operation

1.1 Output menu



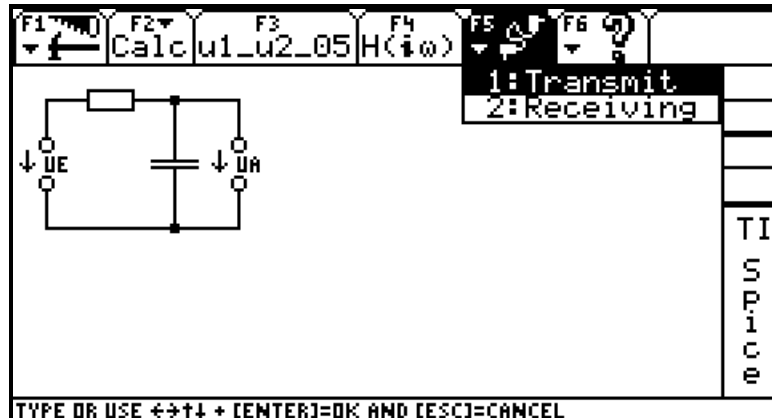
F1:

- | | |
|---------------|--|
| 1:New | creates a new field of work (minimum size is 11 x 5 screen size) it is possible a field of work to create that than the display is larger, thus however the computing times increase. |
| 2:Open | opens circuit file |
| 3:Edit | create or modify to a circuit
cursor keys: move the cursor
enter: key assignment
esc: terminate processing
mode: display the element-worth and calculated worth
clear: delete from elements |
| 4: Save as... | circuit in file store |
| 5: Import | Import a circuit file |
| 6:Language | Select a language for dialog boxes and menus Not yet completely. Edit please tispice\mld with " DATA/MATRIX wordprocessor ". |
| 7:Close | program end |



F2:Calc

- | | |
|---------------------------|--|
| 1: Calculate all | Calculates all current and voltage levels in an alternating current or a direct current network. |
| 2: Eq. create | Created only the set of equations (meshes - and node equations)). |
| 3: Eq. displays | The set of equations displays. All node equations are contained |
| 4: $H(j\omega)$ calculate | Calculates transfer function. |
| 5: $H(j\omega)$ display | Changes into new menu for the display and diagram of the transfer function. |
| 6: $G(s)$ externally | Input of a transfer function. |



F3:

High-speed storage of the file u1_u2_03

F4:

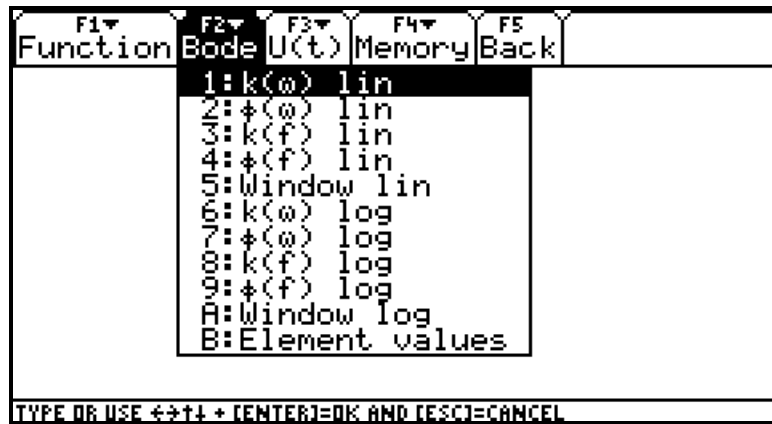
mode-display

- = ...direct current network
- ~ ...a.c. mains factory
- $H(i\omega)$...berecnung the transfer function

F5:Link

Transmitting or receiving a TiSpice data to or other Ti92.

1.2 H(jw)-Menu



F1: Function

- | | |
|------------------------|-----------------------------------|
| 1:G(s) | Display to the transfer function |
| 2:H(j ω) | Display of the frequency response |
| 3:k(ω) | Display of the amplitude response |
| 4: ϕ (ω) | Display of the phase response |
| 3:k(f) | Display of the amplitude response |
| 4: ϕ (f) | Display of the phase response |
| 5:Deq | Display the DifferentialEquations |

F2:Bode

- | | |
|-------------------------|---|
| 1: k(ω) lin to | |
| 4: ϕ (f) lin | Display of the respective Graghen in linear oh scaling |
| 5:Fenster lin | Set the Windowvariable in linear oh scaling |
| 6: k(ω) log to | |
| 9: ϕ (f) log | Display of the respective graph in logarithmic oh scaling |
| A: Window log | Set the Windowvariable in logarithmic oh scaling |
| B: Element values | Input of element values (if on variables one counted). |

F3:U(t)

- | | |
|---------------------|--|
| 1: Deq solve | Solve the differential equation with well-known initially or. Output voltage. This solution assumes all all currents and voltages are at the point in time t=0 zero (all at the beginning of conditions is zero) |
| 2:Graph | Displays the temporal process of input voltage and output voltage. (the Deq must beforehand be solve and the WindowVariable be accordingly set!) |
| 3: Windows | Sets WindowVariable |
| 4: Corner frequency | Calculates the corner frequencies. |

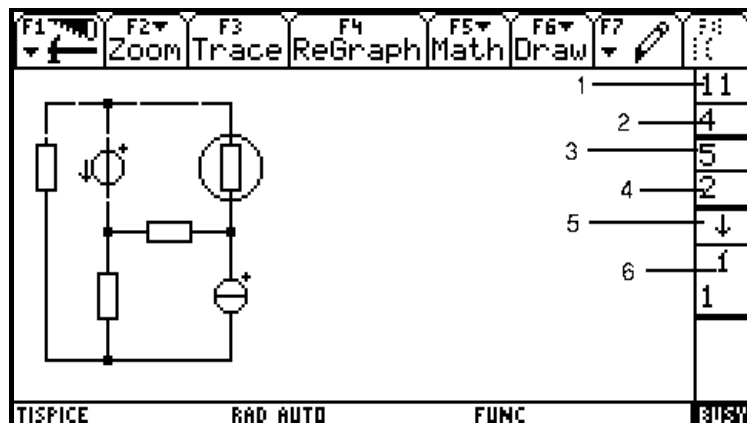
F4: Memory

- | | |
|-----------|--|
| 1:G(s) to | |
| 7:Deq | Respective function in an external Variable stores (also into other directories e.g.: main/deq1) |

F5: Back

Back to the main menue

1.3 Equal and alternating current calculation



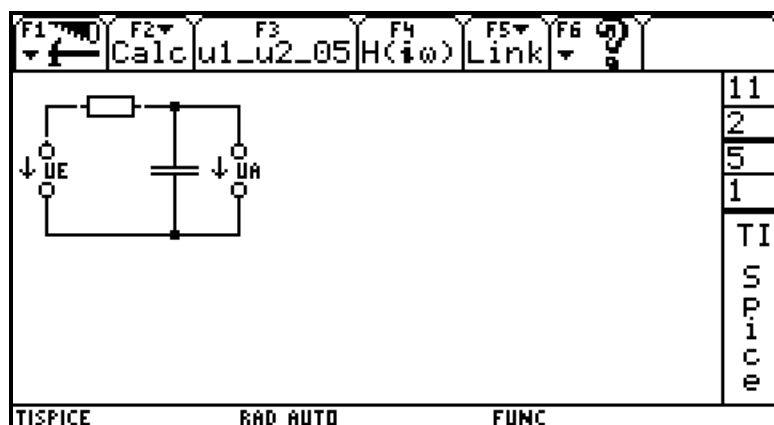
- 1 Horizontal size of the field of work
- 2 Current position horizontal
- 3 Vertical size of the field of work
- 4 Current position vertical
- 5 With the calculation assumed direction of current
- 6 Variable one of the current in the set of equations (here i1 _)

It is to be used possible for individual elements variable. However only the set of equations is then created, since the solve of this set of equations would take considerable time up.

1.4 Transfer function

It exists to calculate the possibility a transfer function of a four-pole network or input a finished function ($G(s)$). With the calculation it is to be used possible variable. After the input or calculation with " F2-5:H(jw) display " into the H(jw) menu change.

Example: u1 u2 05



This example represents a RC low-pass 1, order.

Calculation results:

Functions

1:G(s) Transfer function

$$\frac{1}{|c \cdot r| \cdot s + 1}$$

2:H(jw) Frequency response

$$\left(\frac{1}{\sqrt{c^2 \cdot w^2 \cdot r^2 + 1}} \angle -\tan^{-1}(w \cdot |c \cdot r|) \right)$$

3:k(w)Amplitude response

$$\frac{1}{\sqrt{c^2 \cdot w^2 \cdot r^2 + 1}}$$

4:f(w) Phase response

$$-\tan^{-1}(w \cdot |c \cdot r|)$$

5:k(f) Amplitude response

$$\frac{1}{\sqrt{4 \cdot c^2 \cdot f^2 \cdot p^2 \cdot r^2 + 1}}$$

6:f(f) Phase response

$$-\tan^{-1}(2 \cdot f \cdot p \cdot |c \cdot r|)$$

7:Deq

$$ue = \frac{d}{dt}(ua(t)) \cdot |c \cdot r| + ua$$

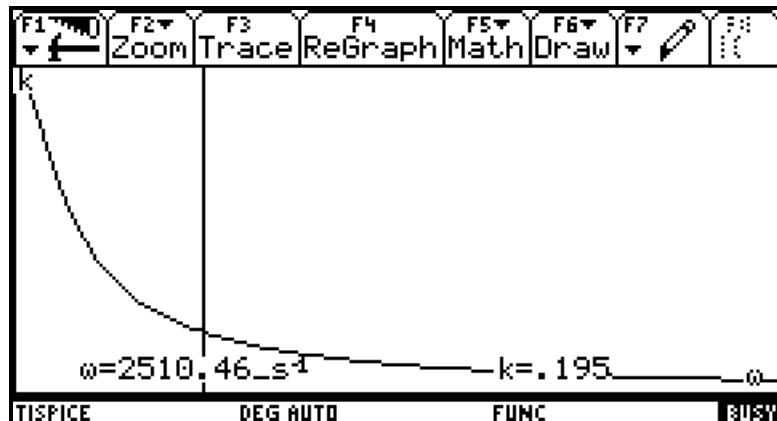
In this example variable were used. The amount lines are unnecessary, since these values from nature are only positive. They are however necessary, since with the Ti no positive variables can be defined. Otherwise with the calculation an enormous amount of Sign functions would develop. The amount lines please ignore.

Bode diagramm

Since on variables one counted here, must first element values are input. (" F2-B: Element values ")

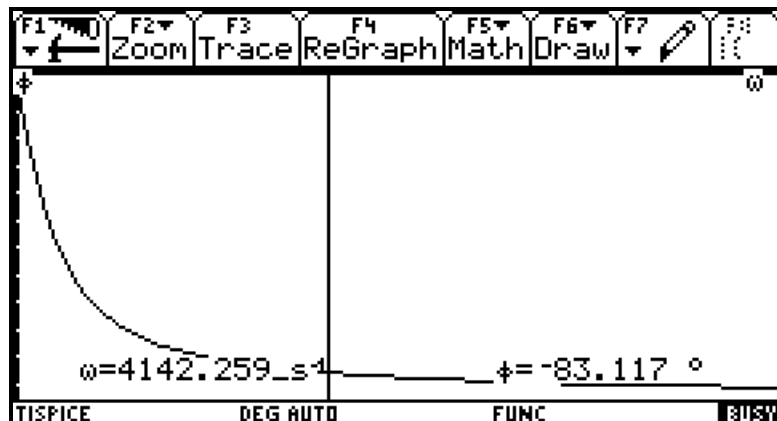
$R=200\Omega$ $C=10\mu F$

1:k(w) lin



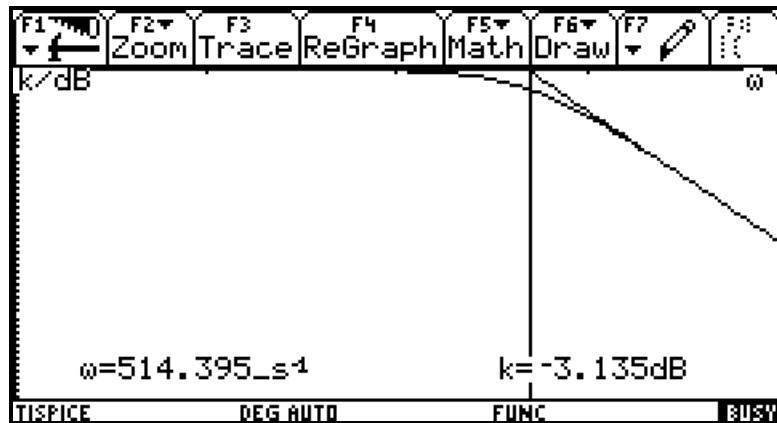
As Windowvariable became here the values of type of status $X_{min}=0$ $X_{max}=10000$ $Y_{min}=0$ and $Y_{max}=1$ uses.

2:f(w) lin



WindowVariable: $X_{min}=0$ $X_{max}=10000$
 $Y_{min}=-90$ $Y_{max}=0$

6:k(w) log



Window Variable: Xmin=0 Xmax=10000
 Ymin= -50 Ymax=0

By press the t-key at the current cursor position a tangent one creates. Thus roughly the corner frequency can be determined.

Here 514Hz.

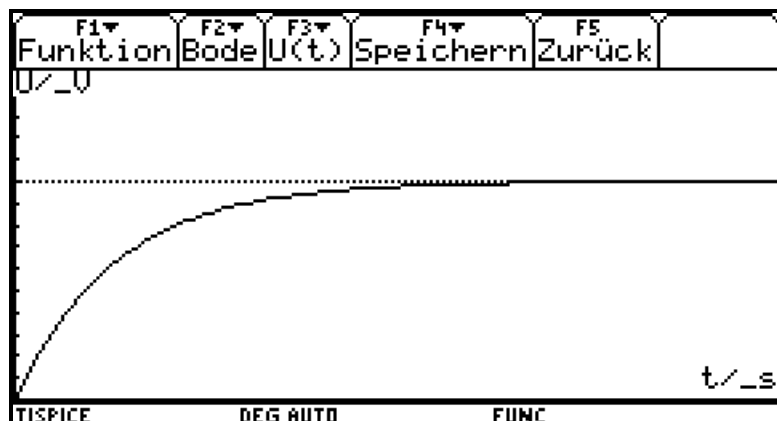
DifferentialEquations

Solve the Deq with " U(t)-1:Deq solve ". An input voltage or an output voltage must be indicated. Here $U_e=10V$. Results those all-side well-known loading function of the condenser.

$$U_a = 10 - 10e^{-500t}$$

Around this function to plot the Window Variable must be set.

Windowvariable: Xmin=0 Xmax=0,015
 Ymin= 0 Ymax=15



contact:

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<http://private.addcom.de/t/ti/>

<http://members.tripod.de/ti92seite/>