User Manual

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1 Circuits by options
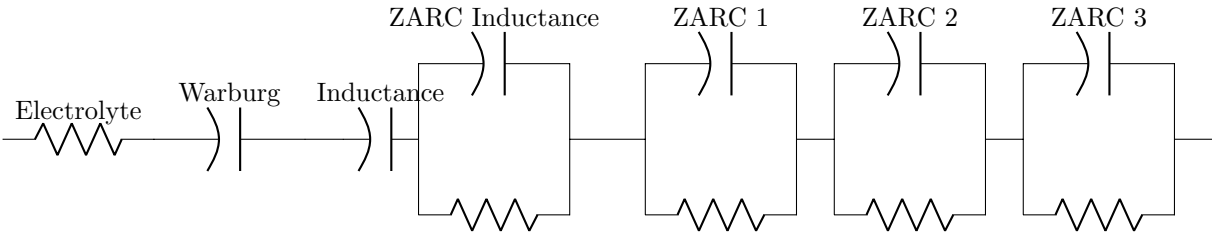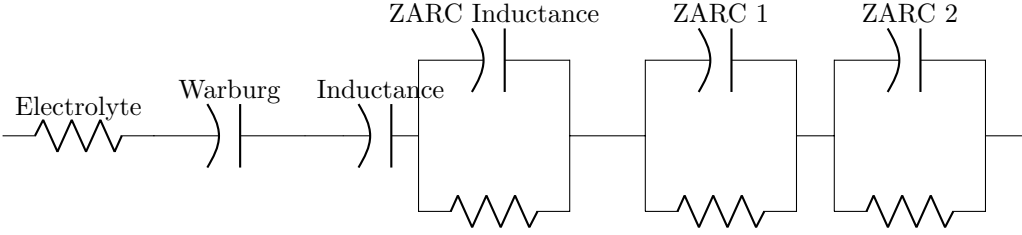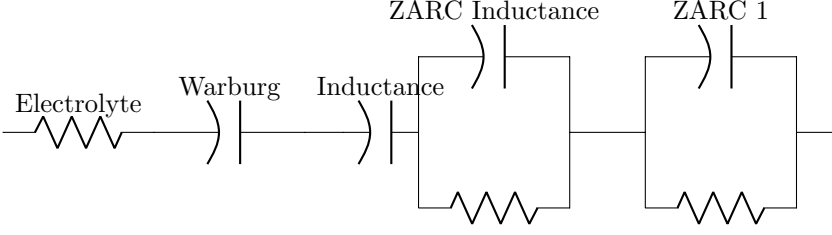
There are some basic options that always must be present, such as mode, logdir, input_dir, dataset, output_dir, so a typical fitting command will start with something like:

```
python manage.py eis_main ^
--mode=import_process_output ^
--logdir=OnePercentTraining ^
--input_dir=RealData\EIS ^
--dataset=USER7 ^
--output_dir=OutputData10
```
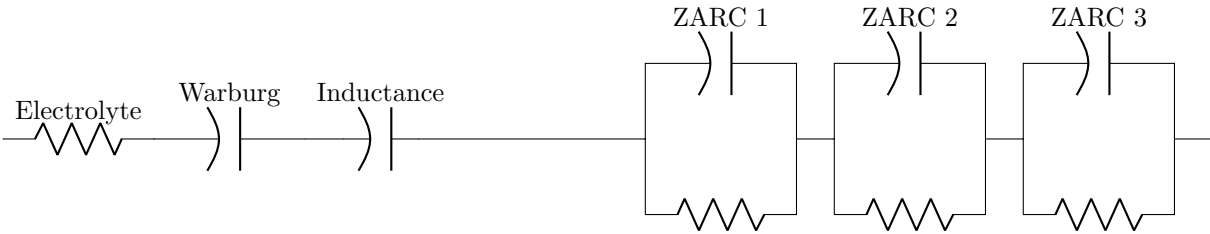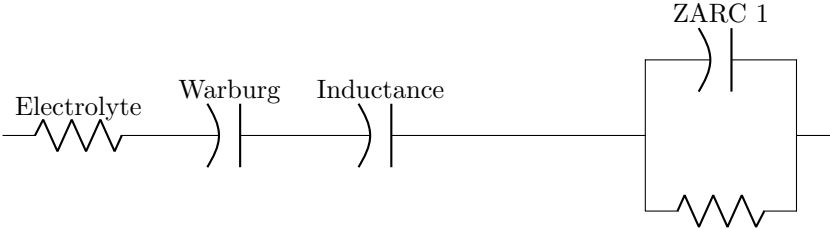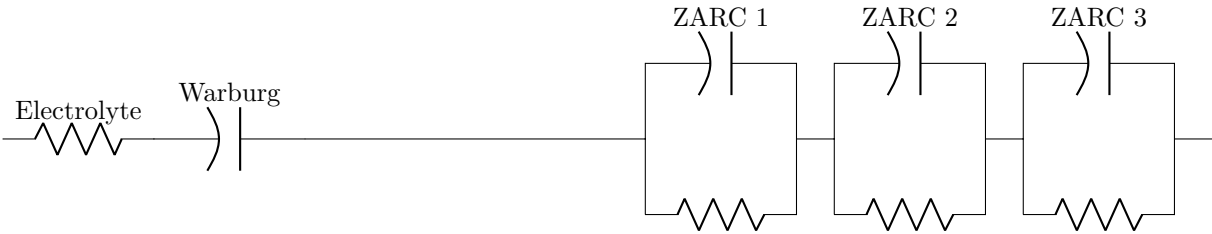
or alteratively, in a single line:

```
python manage.py eis_main --mode=import_process_output --logdir=OnePercentTraining --input_dir=RealData\EIS --dataset=USER7 ...
```

Therefore, we shall only list the additional options for obtaining a specific circuit.

Minimal Options	Full Options	Circuit
——inductance ——zarc_inductance	——inductance ——zarc_inductance ——num_zarcs=3 ——no_warburg_inception	
——inductance ——zarc_inductance ——num_zarcs=2	——inductance ——zarc_inductance ——num_zarcs=2 ——no_warburg_inception	
——inductance ——zarc_inductance ——num_zarcs=1	——inductance ——zarc_inductance ——num_zarcs=1 ——no_warburg_inception	

Minimal Options	Full Options	Circuit
——zarc_inductance	——no_inductance ——zarc_inductance ——num_zarcs=3 ——no_warburg_inception	Electrolyte — Warburg — ZARC Inductance — ZARC 1 — ZARC 2 — ZARC 3
——zarc_inductance ——num_zarcs=2	——no_inductance ——zarc_inductance ——num_zarcs=2 ——no_warburg_inception	Electrolyte — Warburg — ZARC Inductance — ZARC 1 — ZARC 2
——zarc_inductance ——num_zarcs=1	——no_inductance ——zarc_inductance ——num_zarcs=1 ——no_warburg_inception	Electrolyte — Warburg — ZARC Inductance — ZARC 1

Minimal Options	Full Options	Circuit
——inductance	——inductance ——no_zarc_inductance ——num_zarcs=3 ——no_warburg_inception	
——inductance ——num_zarcs=2	——inductance ——no_zarc_inductance ——num_zarcs=2 ——no_warburg_inception	
——inductance ——num_zarcs=1	——inductance ——no_zarc_inductance ——num_zarcs=1 ——no_warburg_inception	

Minimal Options	Full Options	Circuit
	—no_inductance —no_zarc_inductance —num_zarcs=3 —no_warburg_inception	
—num_zarcs=2	—no_inductance —no_zarc_inductance —num_zarcs=2 —no_warburg_inception	
—num_zarcs=1	—no_inductance —no_zarc_inductance —num_zarcs=1 —no_warburg_inception	

Minimal Options	Full Options	Circuit
—inductance —zarc_inductance —warburg_inception	—inductance —zarc_inductance —num_zarcs=3 —warburg_inception	Electrolyte, Inductance, ZARC Inductance, ZARC 1, Warburg, ZARC 2, ZARC 3
—inductance —zarc_inductance —num_zarcs=2 —warburg_inception	—inductance —zarc_inductance —num_zarcs=2 —warburg_inception	Electrolyte, Inductance, ZARC Inductance, ZARC 1, Warburg, ZARC 2
—inductance —zarc_inductance —num_zarcs=1 —warburg_inception	—inductance —zarc_inductance —num_zarcs=1 —warburg_inception	Electrolyte, Inductance, ZARC Inductance, ZARC 1, Warburg

Minimal Options	Full Options	Circuit
──zarc_inductance ──warburg_inception	──no_inductance ──zarc_inductance ──num_zarcs=3 ──warburg_inception	ZARC Inductance ZARC 1 ZARC 2 ZARC 3 Electrolyte Warburg
──zarc_inductance ──num_zarcs=2 ──warburg_inception	──no_inductance ──zarc_inductance ──num_zarcs=2 ──warburg_inception	ZARC Inductance ZARC 1 ZARC 2 Electrolyte Warburg
──zarc_inductance ──num_zarcs=1 ──warburg_inception	──no_inductance ──zarc_inductance ──num_zarcs=1 ──warburg_inception	ZARC Inductance ZARC 1 Electrolyte Warburg

Minimal Options	Full Options	Circuit
—inductance —warburg_inception	—inductance —no_zarc_inductance —num_zarcs=3 —warburg_inception	
—inductance —num_zarcs=2 —warburg_inception	—inductance —no_zarc_inductance —num_zarcs=2 —warburg_inception	
—inductance —num_zarcs=1 —warburg_inception	—inductance —no_zarc_inductance —num_zarcs=1 —warburg_inception	

Minimal Options	Full Options	Circuit
——warburg_inception	——no_inductance ——no_zarc_inductance ——num_zarcs=3 ——warburg_inception	ZARC 1 ZARC 2 ZARC 3 Electrolyte Warburg
——num_zarcs=2 ——warburg_inception	——no_inductance ——no_zarc_inductance ——num_zarcs=2 ——warburg_inception	ZARC 1 ZARC 2 Electrolyte Warburg
——num_zarcs=1 ——warburg_inception	——no_inductance ——no_zarc_inductance ——num_zarcs=1 ——warburg_inception	ZARC 1 Electrolyte Warburg

1.1 Reference on components and parameters

Element	Parameters
Electrolyte	R (ohm), the series resistor
Warburg	- Q_warburg (the units depend on Phi), the magnitude of a Constant Phase Element - Phi_warburg (unitless), the exponent of a Constant Phase Element
Inductance	- Q_inductance (the units depend on Phi), the magnitude of a Constant Phase Element - Phi_inductance (unitless), the exponent of a Constant Phase Element
ZARC Inductance	- R_zarc_impedance (ohm), the resistance - W_c_inductance (rad/s), the characteristic frequency (angular) - Phi_zarc_inductance (unitless), the exponent
ZARC 1	- R_zarc_1 (ohm), the resistance - W_c_zarc_1 (rad/s), the characteristic frequency (angular) - Phi_zarc_1 (unitless), the exponent
ZARC 2	- R_zarc_2 (ohm), the resistance - W_c_zarc_2 (rad/s), the characteristic frequency (angular) - Phi_zarc_2 (unitless), the exponent
ZARC 3	- R_zarc_3 (ohm), the resistance - W_c_zarc_3 (rad/s), the characteristic frequency (angular) - Phi_zarc_3 (unitless), the exponent