MATPOWER

INSTALAÇÃO

- **Website MATPOWER**

  http://www.pserc.cornell.edu//matpower/

- **Download → matpower5.0b1**
- **Colocar na pasta MATLAB**
- **Abrir o MATLAB**
- **Adicionar a pasta matpower5.0b1 ao path do MATLAB**
  - **Clicar com o botão direito em matpower4.0b4**
  - **'Add to path' - 'Selected folders and subfolders'**
- `test_matpower`

EXECUTAR E RESULTADOS

Table D-2: Top-Level Simulation Functions

name	description
runpf	power flow†
runopf	optimal power flow†
runuopf	optimal power flow with unit-decommitment†
rundcpf	DC power flow‡
rundcopf	DC optimal power flow‡
runduopf	DC optimal power flow with unit-decommitment‡
runopf_w_res	optimal power flow with fixed reserve requirements†

† Uses AC model by default.

‡ Simple wrapper function to set option to use DC model before calling the corresponding general function above.

- runpf('case14') → AC
- rundcpf('case14') → DC

DADOS DE ENTRADA

Table D-15: Example Cases

name	description
caseformat	help file documenting MATPOWER case format
case_ieee30	IEEE 30-bus case
case24_ieee_rts	IEEE RTS 24-bus case
case4gs	4-bus example case from Grainger & Stevenson
case6ww	6-bus example case from Wood & Wollenberg
case9	9-bus example case from Chow
case9Q	case9 with reactive power costs
case14	IEEE 14-bus case
case30	30-bus case, based on IEEE 30-bus case
case30pwl	case30 with piecewise linear costs
case30Q	case30 with reactive power costs
case39	39-bus New England case
case57	IEEE 57-bus case
case118	IEEE 118-bus case
case300	IEEE 300-bus case
case2383wp	Polish system - winter 1999-2000 peak
case2736sp	Polish system - summer 2004 peak
case2737sop	Polish system - summer 2004 off-peak
case2746wop	Polish system - winter 2003-04 off-peak
case2746wp	Polish system - winter 2003-04 evening peak

Table B-1: Bus Data (mpc.bus)

name	column	description
BUS_I	1	bus number (positive integer)
BUS_TYPE	2	bus type (1 = PQ, 2 = PV, 3 = ref, 4 = isolated)
PD	3	real power demand (MW)
QD	4	reactive power demand (MVAr)
GS	5	shunt conductance (MW demanded at $V = 1.0$ p.u.)
BS	6	shunt susceptance (MVAr injected at $V = 1.0$ p.u.)
BUS_AREA	7	area number (positive integer)
VM	8	voltage magnitude (p.u.)
VA	9	voltage angle (degrees)
BASE_KV	10	base voltage (kV)
ZONE	11	loss zone (positive integer)
VMAX	12	maximum voltage magnitude (p.u.)
VMIN	13	minimum voltage magnitude (p.u.)
LAM_P†	14	Lagrange multiplier on real power mismatch (u/MW)
LAM_Q†	15	Lagrange multiplier on reactive power mismatch (u/MVAr)
MU_VMAX†	16	Kuhn-Tucker multiplier on upper voltage limit (u/p.u.)
MU_VMIN†	17	Kuhn-Tucker multiplier on lower voltage limit (u/p.u.)

† Included in OPF output, typically not included (or ignored) in input matrix. Here we assume the objective function has units u.

Table B-2: Generator Data (mpc.gen)

name	column	description
GEN_BUS	1	bus number
PG	2	real power output (MW)
QG	3	reactive power output (MVAr)
QMAX	4	maximum reactive power output (MVAr)
QMIN	5	minimum reactive power output (MVAr)
VG	6	voltage magnitude setpoint (p.u.)
MBASE	7	total MVA base of machine, defaults to baseMVA
GEN_STATUS	8	machine status, > 0 = machine in-service; ≤ 0 = machine out-of-service
PMAX	9	maximum real power output (MW)
PMIN	10	minimum real power output (MW)
PC1*	11	lower real power output of PQ capability curve (MW)
PC2*	12	upper real power output of PQ capability curve (MW)
QC1MIN*	13	minimum reactive power output at PC1 (MVAr)
QC1MAX*	14	maximum reactive power output at PC1 (MVAr)
QC2MIN*	15	minimum reactive power output at PC2 (MVAr)
QC2MAX*	16	maximum reactive power output at PC2 (MVAr)
RAMP_AGC*	17	ramp rate for load following/AGC (MW/min)
RAMP_10*	18	ramp rate for 10 minute reserves (MW)
RAMP_30*	19	ramp rate for 30 minute reserves (MW)
RAMP_Q*	20	ramp rate for reactive power (2 sec timescale) (MVAr/min)
APF*	21	area participation factor
MU_PMAX†	22	Kuhn-Tucker multiplier on upper P_g limit (u/MW)
MU_PMIN†	23	Kuhn-Tucker multiplier on lower P_g limit (u/MW)
MU_QMAX†	24	Kuhn-Tucker multiplier on upper Q_g limit (u/MVAr)
MU_QMIN†	25	Kuhn-Tucker multiplier on lower Q_g limit (u/MVAr)

* Not included in version 1 case format.

† Included in OPF output, typically not included (or ignored) in input matrix. Here we assume the objective function has units u.

Table B-3: Branch Data (mpc.branch)

name	column	description
F_BUS	1	"from" bus number
T_BUS	2	"to" bus number
BR_R	3	resistance (p.u.)
BR_X	4	reactance (p.u.)
BR_B	5	total line charging susceptance (p.u.)
RATE_A	6	MVA rating A (long term rating)
RATE_B	7	MVA rating B (short term rating)
RATE_C	8	MVA rating C (emergency rating)
TAP	9	transformer off nominal turns ratio, (taps at "from" bus, impedance at "to" bus, i.e. if $r = x = 0$, $tap = \frac{\lvert V_f \rvert}{\lvert V_t \rvert}$)
SHIFT	10	transformer phase shift angle (degrees), positive ⇒ delay
BR_STATUS	11	initial branch status, 1 = in-service, 0 = out-of-service
ANGMIN*	12	minimum angle difference, $\theta_f - \theta_t$ (degrees)
ANGMAX*	13	maximum angle difference, $\theta_f - \theta_t$ (degrees)
PF†	14	real power injected at "from" bus end (MW)
QF†	15	reactive power injected at "from" bus end (MVAr)
PT†	16	real power injected at "to" bus end (MW)
QT†	17	reactive power injected at "to" bus end (MVAr)
MU_SF‡	18	Kuhn-Tucker multiplier on MVA limit at "from" bus (u/MVA)
MU_ST‡	19	Kuhn-Tucker multiplier on MVA limit at "to" bus (u/MVA)
MU_ANGMIN‡	20	Kuhn-Tucker multiplier lower angle difference limit (u/degree)
MU_ANGMAX‡	21	Kuhn-Tucker multiplier upper angle difference limit (u/degree)

* Not included in version 1 case format.
† Included in power flow and OPF output, ignored on input.
‡ Included in OPF output, typically not included (or ignored) in input matrix. Here we assume the objective function has units u.

EXEMPLO - 14 barras IEEE

```
>> mpopt = mpoption('PF_ALG', 2, 'VERBOSE', 2, 'OUT_ALL', 0);
>> results = runpf('case300', mpopt);
```

OPÇÕES DE EXECUÇÃO

Table 4-2: Power Flow Options

idx	name	default	description
1	PF_ALG	1	AC power flow algorithm: 1 – Newtons's method 2 – Fast-Decoupled (XB version) 3 – Fast-Decouple (BX version) 4 – Gauss-Seidel
2	PF_TOL	10^{-8}	termination tolerance on per unit P and Q dispatch
3	PF_MAX_IT	10	maximum number of iterations for Newton's method
4	PF_MAX_IT_FD	30	maximum number of iterations for fast decoupled method
5	PF_MAX_IT_GS	1000	maximum number of iterations for Gauss-Seidel method
6	ENFORCE_Q_LIMS	0	enforce gen reactive power limits at expense of $\|V_m\|$ 0 – do *not* enforce limits 1 – enforce limits, simultaneous bus type conversion 2 – enforce limits, one-at-a-time bus type conversion
10	PF_DC	0	DC modeling for power flow and OPF formulation 0 – use AC formulation and corresponding alg options 1 – use DC formulation and corresponding alg options

OPÇÕES PARA SAÍDA DE DADOS

Table 4-3: Power Flow Output Options

idx	name	default	description
31	VERBOSE	1	amount of progress info to be printed 0 – print no progress info 1 – print a little progress info 2 – print a lot progress info 3 – print all progress info
32	OUT_ALL	-1	controls pretty-printing of results -1 – individual flags control what is printed 0 – do *not* print anything† 1 – print everything†
33	OUT_SYS_SUM	1	print system summary (0 or 1)
34	OUT_AREA_SUM	0	print area summaries (0 or 1)
35	OUT_BUS	1	print bus detail, includes per bus gen info (0 or 1)
36	OUT_BRANCH	1	print branch detail (0 or 1)
37	OUT_GEN	0	print generator detail (0 or 1)

† Overrides individual flags.