

Example of FAC

```
program grid
integer uxf,uyf
parameter(dx=400,dy=400,nx=6,ny=6)
parameter(lxf=2,lyf=2,uxf=4,uyf=4)
parameter(mfc=3)
c determine the number of fine grid pts in x-direction
c
parameter(nfgx = uxf-lxf + 1 + (uxf-lxf)*(mfc-1))
c determine the number of fine grid pts in y-direction
c
parameter(nfgy = uyf-lyf + 1 + (uyf-lyf)*(mfc-1))
dimension h(ny,nx)
dimension f(ny,nx)
dimension hf(nfgy,nfgx)
c set the heads on the coarse grid
call cgrid(h,f)
c begin coarse-fine fac iteration
do 888 k = 1,7
c solve for heads on coarse grid
call solvec(h,f)
c put the coarse grid heads on the interface points
call fgrid(h,hf)
c interpolate the head on south & north boundaries
call xinterp(hf)
c interpolate the head on west & east boundaries
call yinterp(hf)
c solve for heads on fine grid
call solvef(hf)
c inject fine grid head values onto coarse grid heads
call fcinj(h,hf)
c calculate residuals at interface points of coarse
c grid
call resint(h,f,hf)
888 continue
end
```

initial coarse grid heads

1.00	-1.00	-1.00	-1.00	-1.00	-1.00
1.00	0.00	0.00	0.00	0.00	-1.00
1.00	0.00	0.00	0.00	0.00	-1.00
1.00	0.00	0.00	0.00	0.00	-1.00
1.00	0.00	0.00	0.00	0.00	-1.00
1.00	1.00	1.00	1.00	1.00	1.00

steady state heads on coarse grid

1.00	-1.00	-1.00	-1.00	-1.00	-1.00
1.00	0.00	-0.41	-0.64	-0.82	-1.00
1.00	0.41	0.00	-0.32	-0.64	-1.00
1.00	0.64	0.32	0.00	-0.41	-1.00
1.00	0.82	0.64	0.41	0.00	-1.00
1.00	1.00	1.00	1.00	1.00	1.00

fine-coarse interface head values

0.41*****	0.00*****	-0.32
*****	*****	*****
*****	*****	*****
0.64*****	0.32*****	0.00
*****	*****	*****
*****	*****	*****
0.82*****	0.64*****	0.41

interpolated boundary condition on fine grid

0.41	0.27	0.14	0.00	-0.11	-0.21	-0.32
0.49*****	*****	*****	*****	*****	*****	-0.21
0.56*****	*****	*****	*****	*****	*****	-0.11
0.64*****	0.32*****	*****	*****	*****	*****	0.00
0.70*****	*****	*****	*****	*****	*****	0.14
0.76*****	*****	*****	*****	*****	*****	0.27
0.82	0.76	0.70	0.64	0.56	0.49	0.41

fine grid head values

0.41	0.27	0.14	0.00	-0.11	-0.21	-0.32
0.49	0.36	0.24	0.11	0.00	-0.10	-0.21
0.56	0.44	0.33	0.22	0.11	0.00	-0.11
0.64	0.53	0.42	0.32	0.22	0.11	0.00
0.70	0.60	0.51	0.42	0.33	0.24	0.14

0.76	0.68	0.60	0.53	0.44	0.36	0.27
0.82	0.76	0.70	0.64	0.56	0.49	0.41

coarse grid heads after injection

1.00	-1.00	-1.00	-1.00	-1.00	-1.00
1.00	0.00	-0.41	-0.64	-0.82	-1.00
1.00	0.41	0.00	-0.32	-0.64	-1.00
1.00	0.64	0.32	0.00	-0.41	-1.00
1.00	0.82	0.64	0.41	0.00	-1.00
1.00	1.00	1.00	1.00	1.00	1.00

residuals on the interface points

0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	-0.04	0.00	0.00	0.00
0.00	0.02	0.00	-0.04	0.00	0.00
0.00	0.00	0.02	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00

This completes on coarse-fine iteration

steady state heads on coarse grid

1.00	-1.00	-1.00	-1.00	-1.00	-1.00
1.00	0.00	-0.40	-0.63	-0.82	-1.00
1.00	0.41	0.02	-0.31	-0.63	-1.00
1.00	0.63	0.33	0.02	-0.40	-1.00
1.00	0.82	0.63	0.41	0.00	-1.00
1.00	1.00	1.00	1.00	1.00	1.00

fine-coarse interface head values

```

0.41***** 0.02***** -0.31
*****
*****
0.63***** 0.33***** 0.02
*****
*****
0.82***** 0.63***** 0.41

```

interpolated boundary condition on fine grid

0.41	0.28	0.15	0.02	-0.09	-0.20	-0.31
0.49	*****	*****	*****	*****	*****	-0.20
0.56	*****	*****	*****	*****	*****	-0.09
0.63	*****	0.33	*****	*****	*****	0.02
0.69	*****	*****	*****	*****	*****	0.15
0.76	*****	*****	*****	*****	*****	0.28
0.82	0.76	0.69	0.63	0.56	0.49	0.41

fine grid head values

0.41	0.28	0.15	0.02	-0.09	-0.20	-0.31
0.49	0.36	0.24	0.13	0.02	-0.09	-0.20
0.56	0.45	0.34	0.23	0.12	0.02	-0.09
0.63	0.53	0.43	0.33	0.23	0.13	0.02
0.69	0.60	0.52	0.43	0.34	0.24	0.15
0.76	0.68	0.60	0.53	0.45	0.36	0.28
0.82	0.76	0.69	0.63	0.56	0.49	0.41

coarse grid heads after injection

1.00	-1.00	-1.00	-1.00	-1.00	-1.00
1.00	0.00	-0.40	-0.63	-0.82	-1.00
1.00	0.41	0.02	-0.31	-0.63	-1.00
1.00	0.63	0.33	0.02	-0.40	-1.00
1.00	0.82	0.63	0.41	0.00	-1.00
1.00	1.00	1.00	1.00	1.00	1.00

residuals on the interface points

0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	-0.02	0.00	0.00	0.00
0.00	0.01	0.00	-0.02	0.00	0.00
0.00	0.00	0.01	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00

steady state heads on coarse grid

1.00	-1.00	-1.00	-1.00	-1.00	-1.00
1.00	0.00	-0.40	-0.63	-0.81	-1.00
1.00	0.42	0.02	-0.30	-0.63	-1.00
1.00	0.63	0.33	0.02	-0.40	-1.00
1.00	0.82	0.63	0.42	0.00	-1.00
1.00	1.00	1.00	1.00	1.00	1.00

fine-coarse interface head values

0.42	0.02	-0.30

0.63	0.33	0.02

0.82	0.63	0.42

interpolated boundary condition on fine grid

0.42	0.28	0.15	0.02	-0.08	-0.19	-0.30
0.49	*****					-0.19
0.56	*****					-0.08
0.63	0.33	*****				0.02
0.69	*****					0.15
0.76	*****					0.28
0.82	0.76	0.69	0.63	0.56	0.49	0.42

fine grid head values

0.42	0.28	0.15	0.02	-0.08	-0.19	-0.30
0.49	0.37	0.25	0.13	0.02	-0.09	-0.19
0.56	0.45	0.34	0.23	0.13	0.02	-0.08
0.63	0.53	0.43	0.33	0.23	0.13	0.02
0.69	0.60	0.52	0.43	0.34	0.25	0.15
0.76	0.68	0.60	0.53	0.45	0.37	0.28
0.82	0.76	0.69	0.63	0.56	0.49	0.42

coarse grid heads after injection

1.00	-1.00	-1.00	-1.00	-1.00	-1.00
1.00	0.00	-0.40	-0.63	-0.81	-1.00
1.00	0.42	0.02	-0.30	-0.63	-1.00
1.00	0.63	0.33	0.02	-0.40	-1.00
1.00	0.82	0.63	0.42	0.00	-1.00
1.00	1.00	1.00	1.00	1.00	1.00

hit a number key to continue

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0.122433	0.122343	0.122433	0.122343		
residuals on the interface points					
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	-0.01	0.00	0.00	0.00
0.00	0.00	0.00	-0.01	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00