

# DOMINANCE MATRICES IN THE AFL, DO THEY ACTUALLY WORK?

DANIEL TOMARO



# OBJECTIVE

Using dominance matrices creates the ability to rank teams accurately even if they haven't competed against each other in a season.

Our goal is to see if the dominance matrix method applied to the 2022 season after a certain number of rounds will give similar team rankings as the actual ladder after round 23.

Via the following calculation,  $r1 = D(m)1 - (D(m))^T 1$ , a first order ranking ( $r1$ ) is established which is the most significant indicator in ranking teams.

A second order ranking is then calculated using  $r2 = (D(m))^2 1 - ((D(m))^2)^T 1$ .

Walter (2011) suggests, supported by Swift (2009), that the second order ranking should be multiplied by 0.5 due to being less significant.

Finally, in case when for some rounds two teams played twice only the average of both scores will be considered and the winner awarded from that calculation. Rounds 10, 16 and 22 will be used for calculations for even distribution of early to late season.

# AFTER 10 ROUNDS

FIGURE 1.1 AFTER ROUND 10 DOMINANCE MATRIX

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	geelong	0	0	0	0	4	0	4	0	0	0	4	4	0	4	4	4	4	4	24
2	melbourne	0	0	0	0	0	0	4	4	0	4	4	4	4	0	4	4	4	4	46
3	sydney	4	0	0	0	0	0	0	0	0	0	0	0	4	0	4	4	4	4	24
4	collingwood	0	0	0	0	4	0	0	0	0	0	0	4	0	4	4	0	0	0	26
5	fremantle	4	0	0	0	0	0	0	0	0	4	0	0	0	4	4	4	4	4	28
6	brisbane	0	0	4	4	4	0	0	0	0	0	0	4	4	0	4	4	0	4	32
7	richmond	0	0	0	0	0	4	0	0	0	4	0	4	4	0	4	4	4	0	28
8	bulldogs	0	0	4	4	4	0	0	0	0	0	4	4	4	0	4	4	4	0	28
9	carlton	0	0	0	4	0	0	0	4	4	0	0	4	0	4	4	0	4	0	32
10	st kilda	4	0	0	0	4	0	0	0	0	0	0	4	4	4	4	4	4	0	28
11	port adelaide	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	4	4	16
12	gold coast	0	0	4	0	0	0	0	0	0	4	4	0	0	0	0	0	0	4	16
13	hawthorn	4	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	4	16
14	adelaide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	essendon	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0
16	gws	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	12
17	west coast	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	north	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0
19	after 10 r1	geelong	melbourne	sydney	collingwood	frem	brisbane	richmond	bulldogs	carlton	st kilda	port	gold coast	haws	adelaide	essendon	gws	eagles	north	SUM
20	geelong	32	0	0	0	16	32	16	16	32	16	16	16	64	64	32	32	80	48	646
21	melbourne	0	32	0	0	32	0	32	0	0	0	0	32	16	16	32	16	16	32	272
22	sydney	36	0	32	0	32	0	32	0	0	0	0	32	16	16	32	16	16	32	272
23	collingwood	0	0	0	32	0	32	0	32	16	32	0	16	16	32	48	16	32	32	384
24	fremantle	32	0	16	32	32	32	32	0	0	48	16	32	48	16	32	32	32	32	384
25	brisbane	16	0	16	32	0	16	16	32	16	16	32	16	16	32	32	16	64	32	432
26	richmond	16	0	32	32	16	0	0	16	16	16	16	48	32	64	32	0	32	32	432
27	bulldogs	32	0	32	32	16	0	0	16	16	16	32	32	32	32	32	16	48	32	406
28	carlton	32	0	16	32	0	16	16	48	0	16	32	48	48	32	80	64	64	506	
29	st kilda	32	0	16	32	16	32	32	32	0	48	32	16	32	48	48	64	48	344	
30	port adelaide	16	0	16	32	16	0	16	0	0	0	32	32	32	32	16	16	16	16	256
31	gold coast	32	0	16	32	16	0	16	16	16	0	16	0	32	32	32	48	32	48	352
32	hawthorn	0	0	16	32	0	16	0	16	16	16	32	16	0	16	32	16	48	48	304
33	adelaide	0	0	0	0	0	0	0	32	0	16	0	32	32	16	32	32	16	32	288
34	essendon	16	0	0	0	16	16	16	16	0	0	32	0	0	0	0	0	0	0	112
35	gws	0	0	0	0	16	16	0	16	16	16	0	16	0	0	0	0	0	0	128
36	west coast	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0
37	north	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	after 10 r2	geelong	melbourne	sydney	collingwood	frem	brisbane	richmond	bulldogs	carlton	st kilda	port	gold coast	haws	adelaide	essendon	gws	eagles	north	SUM
39	geelong	0	0	0	4	0	4	0	0	0	0	4	0	0	4	0	0	0	0	16
40	melbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	sydney	0	0	0	0	0	4	0	0	4	0	0	0	4	0	0	0	0	0	16
42	collingwood	4	0	0	0	0	4	0	4	4	0	0	0	0	0	0	0	4	0	26
43	fremantle	0	0	0	0	4	0	0	0	0	0	4	0	4	0	0	0	0	0	12
44	brisbane	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	8
45	richmond	0	4	0	0	0	0	4	0	4	4	0	0	0	4	0	0	0	0	24
46	bulldogs	0	4	0	0	0	0	0	4	0	4	0	4	0	4	0	0	0	0	24
47	carlton	0	0	0	0	4	0	0	0	0	0	4	0	4	0	0	0	0	0	16
48	st kilda	0	4	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	12
49	port adelaide	4	0	0	0	4	0	0	0	0	0	4	0	0	4	0	0	0	0	24
50	gold coast	0	4	0	0	0	0	4	4	4	4	0	0	0	0	0	4	0	0	28
51	hawthorn	0	4	0	0	0	0	4	4	4	4	4	0	0	0	4	4	0	0	28
52	adelaide	0	0	0	0	0	0	0	4	4	4	4	0	0	0	4	4	0	0	32
53	essendon	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	0	32
54	gws	4	4	4	4	0	4	0	4	4	4	0	0	0	0	0	0	0	0	32
55	west coast	0	4	4	0	4	4	4	4	0	0	0	4	4	0	0	4	0	4	36
56	north	4	4	4	0	4	4	4	4	0	0	0	4	4	0	0	4	0	0	36
57	after 10 r3	geelong	melbourne	sydney	collingwood	frem	brisbane	richmond	bulldogs	carlton	st kilda	port	gold coast	haws	adelaide	essendon	gws	eagles	north	SUM
58	geelong	0	0	0	32	0	16	16	16	32	32	32	16	16	32	0	16	0	0	272
59	melbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	sydney	16	32	32	16	16	16	32	32	16	16	16	16	16	16	16	16	16	0	256
61	collingwood	16	48	32	0	32	16	32	0	32	32	32	16	32	32	0	16	0	16	384
62	fremantle	16	32	32	0	32	0	32	32	16	32	0	16	16	0	0	16	16	0	240
63	brisbane	0	16	32	0	16	0	16	16	16	16	32	0	0	16	0	16	0	0	176
64	richmond	0	16	32	0	32	32	16	0	16	16	16	16	16	0	0	16	16	0	208
65	bulldogs	16	32	32	0	16	32	32	0	16	16	32	32	32	16	16	16	0	0	320
66	carlton	0	16	0	32	0	16	16	16	16	0	32	0	16	0	0	16	0	0	160
67	st kilda	32	16	0	0	0	32	16	0	0	0	16	16	0	0	16	0	0	0	272
68	port adelaide	16	16	16	32	16	48	16	16	32	32	48	0	16	32	0	32	16	0	368
69	gold coast	48	64	16	16	16	16	48	16	48	32	32	0	16	32	0	0	16	0	432
70	hawthorn	16	64	16	32	32	32	32	32	48	16	32	32	0	32	0	0	0	0	432
71	adelaide	16	64	32	48	48	32	64	32	32	32	32	32	16	16	0	0	16	0	544
72	essendon	32	32	32	16	16	16	32	32	48	48	16	32	32	32	0	16	0	0	432
73	gws	32	32	32	16	0	16	32	48	16	16	16	16	0	0	0	0	0	0	320
74	west coast	64	80	32	32	32	64	32	48	80	64	16	32	48	32	0	16	0	0	672
75	north	32	48	32	32	16	32	32	32	64	64	16	48	64	32	16	0	0	0	528

Name	r	Ranking	Actual Position after 10	Actual position after 23	Difference
geelong	56	7	6	1	-6
melbourne	360	1	1	2	1
sydney	16	9	7	3	-6
collingwood	-8	10	10	4	-6
fremantle	88	6	4	5	-1
brisbane	144	4	2	6	2
richmond	116	5	8	7	2
bulldogs	48	8	9	8	0
carlton	224	2	3	9	7
st kilda	200	3	5	10	7
port adelaide	-64	12	11	11	-1
gold coast	-44	11	12	12	1
hawthorn	-68	13	13	13	0
adelaide	-156	15	15	14	-1
essendon	-184	16	16	15	-1
gws	-112	14	14	16	2
west coast	-328	18	18	17	-1
north	-288	17	17	18	1

FIGURE 1.2 AFTER ROUND 10 RANKING

The following dominance matrices show after m rounds, after m rounds squared, after m rounds transposed and finally after m rounds transposed and squared. This was used to calculate r1, r2 and lastly r to determine ranking position, through the formulas displayed earlier.

1	AFTER 16	geelong	melbourne	sydney	collingwood	freo	brisbane	richmond	bulldogs	carlton	seals	port	goldcoast	hawks	adelaide	essendon	gws	nights	north	SUM
2	geelong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
3	melbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
4	sydney	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
5	collingwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
6	fremantle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
7	brisbane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
8	richmond	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
9	bulldogs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
10	carlton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
11	seals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
12	port adelaide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
13	gold coast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
14	hawks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
15	adelaide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
16	essendon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
17	gws	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
18	west coast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
19	north	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
20	sum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
21	AFTER 16 T	geelong	melbourne	sydney	collingwood	freo	brisbane	richmond	bulldogs	carlton	seals	port	goldcoast	hawks	adelaide	essendon	gws	nights	north	SUM
22	geelong	0	16	0	48	64	16	0	16	64	16	64	64	96	80	96	64	112	80	960
23	melbourne	0	0	0	64	64	32	32	64	32	48	64	64	96	96	80	64	128	128	1136
24	sydney	0	0	0	0	0	16	48	48	48	48	16	32	64	64	80	80	64	80	864
25	collingwood	0	0	0	0	0	32	48	64	48	48	32	80	48	112	112	48	64	80	1288
26	fremantle	0	0	0	0	0	48	64	96	0	64	96	64	96	64	112	128	1104	0	0
27	brisbane	0	0	0	0	0	0	48	32	48	48	64	16	80	112	96	80	64	112	1056
28	richmond	0	0	0	0	0	32	16	0	16	32	48	16	64	80	80	64	32	64	796
29	bulldogs	0	0	0	0	0	32	16	32	16	32	48	32	32	80	64	48	32	80	720
30	carlton	0	0	0	0	0	16	32	48	0	48	48	64	80	48	64	48	112	96	816
31	seals	0	0	0	0	0	32	16	48	48	64	32	0	96	32	80	80	64	112	960
32	port adelaide	0	0	0	0	0	32	16	0	32	0	32	32	0	32	80	64	48	48	640
33	gold coast	0	0	0	0	0	32	48	32	16	16	64	0	48	32	64	48	64	80	656
34	hawks	0	0	0	0	0	32	0	16	16	48	0	32	32	32	0	32	64	48	484
35	adelaide	0	0	0	0	0	32	0	16	16	48	0	32	16	48	32	16	64	32	632
36	essendon	0	0	0	0	0	16	16	32	16	16	0	32	16	16	16	16	48	48	288
37	gws	0	0	0	0	0	16	16	16	16	16	0	32	0	16	16	16	0	48	304
38	west coast	0	0	0	0	0	16	0	0	0	0	0	16	32	32	16	16	0	0	192
39	north	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	32
40	sum	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	32
41	AFTER 16 T	geelong	melbourne	sydney	collingwood	freo	brisbane	richmond	bulldogs	carlton	seals	port	goldcoast	hawks	adelaide	essendon	gws	nights	north	SUM
42	geelong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
43	melbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
44	sydney	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
45	collingwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
46	fremantle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
47	brisbane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
48	richmond	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
49	bulldogs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
50	carlton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
51	seals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
52	port adelaide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
53	gold coast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
54	hawks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
55	adelaide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
56	essendon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
57	gws	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
58	west coast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
59	north	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
60	sum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
61	AFTER 16 T T	geelong	melbourne	sydney	collingwood	freo	brisbane	richmond	bulldogs	carlton	seals	port	goldcoast	hawks	adelaide	essendon	gws	nights	north	SUM
62	geelong	0	16	0	48	64	16	0	16	64	16	64	64	96	80	96	64	112	80	960
63	melbourne	0	0	0	64	64	32	32	64	32	48	64	64	96	96	80	64	128	128	1136
64	sydney	0	0	0	0	0	16	48	48	48	16	32	64	64	80	80	64	80	80	864
65	collingwood	0	0	0	0	0	32	48	64	48	32	80	48	112	112	48	64	80	80	1288
66	fremantle	0	0	0	0	0	48	64	96	0	64	96	64	96	64	112	128	1104	0	0
67	brisbane	0	0	0	0	0	0	48	32	48	48	64	16	80	112	96	80	64	112	1056
68	richmond	0	0	0	0	0	32	16	0	16	32	48	16	64	80	80	64	32	64	796
69	bulldogs	0	0	0	0	0	32	16	32	16	32	48	32	32	80	64	48	32	80	720
70	carlton	0	0	0	0	0	16	32	48	0	48	48	64	80	48	64	48	112	96	816
71	seals	0	0	0	0	0	32	16	48	48	64	32	0	96	32	80	80	64	112	960
72	port adelaide	0	0	0	0	0	32	16	0	32	0	32	32	0	32	80	64	48	48	640
73	gold coast	0	0	0	0	0	32	48	32	16	16	64	0	48	32	64	48	64	80	656
74	hawks	0	0	0	0	0	32	0	16	16	48	0	32	32	32	0	32	64	48	484
75	adelaide	0	0	0	0	0	32	0	16	16	48	0	32	16	48	32	16	64	32	632
76	essendon	0	0	0	0	0	16	16	32	16	16	0	32	16	16	16	16	48	48	288
77	gws	0	0	0	0	0	16	16	16	16	16	0	32	0	16	16	16	0	48	304
78	west coast	0	0	0	0	0	16	0	0	0	0	0	16	32	32	16	16	0	0	192
79	north	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	32
80	sum	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	32

FIGURE 2.1 AFTER ROUND 16 DOMINANCE MATRIX

Name	r	Ranking	Actual Position after 16	Actual position after 23	Difference
geelong	304	4	2	1	-3
melbourne	500	1	1	2	1
sydney	200	8	8	3	-5
collingwood	272	5	6	4	-1
fremantle	432	2	4	5	3
brisbane	388	3	3	6	3
richmond	112	9	7	7	-2
bulldogs	48	10	10	8	-2
carlton	252	6	5	9	3
st kilda	204	7	9	10	3
port adelaide	-52	11	12	11	0
gold coast	-68	12	11	12	0
hawthorn	-340	15	15	13	-2
adelaide	-328	14	14	14	0
essendon	-376	16	16	15	-1
gws	-244	13	13	16	3
west coast	-600	17	17	17	0
north	-704	18	18	18	0

FIGURE 2.2 AFTER ROUND 16 RANKING

The following dominance matrices show after m rounds, after m rounds squared, after m rounds transposed and finally after m rounds transposed and squared. This was used to calculate r1, r2 and lastly r

AT 18-22	geelong	melbourne	sydney	collingwood	freo	brisbane	richmond	hullings	carlton	seals	port	gold coast	hawks	adelaide	essendon	gem	negles	north	SUM
geelong	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
melbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sydney	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
collingwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
freemantle	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
brisbane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
richmond	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hullings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
carlton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
seals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
port adelaide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
gold coast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hawks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
adelaide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
essendon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
gem	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
negles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
north	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AT 18-22	geelong	melbourne	sydney	collingwood	freo	brisbane	richmond	hullings	carlton	seals	port	gold coast	hawks	adelaide	essendon	gem	negles	north	SUM
geelong	0	16	80	80	64	40	32	64	96	64	96	96	128	128	128	144	112	160	1608
melbourne	16	0	80	80	64	40	32	64	96	64	96	96	112	112	112	128	96	176	1600
sydney	80	80	0	80	80	80	80	80	80	80	80	80	112	112	112	128	112	160	1320
collingwood	80	80	80	0	80	80	80	80	80	80	80	80	112	112	112	128	96	160	1320
freemantle	64	64	64	64	0	80	80	80	80	80	80	80	112	112	112	128	96	160	1320
brisbane	40	40	40	40	0	80	80	80	80	80	80	80	112	112	112	128	96	160	1320
richmond	32	32	32	32	32	0	80	80	80	80	80	80	112	112	112	128	96	160	1320
hullings	64	64	64	64	64	64	0	80	80	80	80	80	112	112	112	128	96	160	1320
carlton	96	96	96	96	96	96	96	0	80	80	80	80	112	112	112	128	96	160	1320
seals	96	96	96	96	96	96	96	80	0	80	80	80	112	112	112	128	96	160	1320
port adelaide	144	144	144	144	144	144	144	144	144	144	144	144	0	80	80	80	80	160	1320
gold coast	128	128	128	128	128	128	128	128	128	128	128	128	80	0	80	80	80	160	1320
hawks	128	128	128	128	128	128	128	128	128	128	128	128	80	80	0	80	80	160	1320
adelaide	144	144	144	144	144	144	144	144	144	144	144	144	80	80	80	0	80	160	1320
essendon	112	112	112	112	112	112	112	112	112	112	112	112	80	80	80	80	0	160	1320
gem	112	112	112	112	112	112	112	112	112	112	112	112	80	80	80	80	80	0	160
negles	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	0
north	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
SUM	1608	1600	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320
AT 18-22	geelong	melbourne	sydney	collingwood	freo	brisbane	richmond	hullings	carlton	seals	port	gold coast	hawks	adelaide	essendon	gem	negles	north	SUM
geelong	0	16	80	80	64	40	32	64	96	64	96	96	128	128	128	144	112	160	1608
melbourne	16	0	80	80	64	40	32	64	96	64	96	96	112	112	112	128	96	176	1600
sydney	80	80	0	80	80	80	80	80	80	80	80	80	112	112	112	128	112	160	1320
collingwood	80	80	80	0	80	80	80	80	80	80	80	80	112	112	112	128	96	160	1320
freemantle	64	64	64	64	0	80	80	80	80	80	80	80	112	112	112	128	96	160	1320
brisbane	40	40	40	40	0	80	80	80	80	80	80	80	112	112	112	128	96	160	1320
richmond	32	32	32	32	32	0	80	80	80	80	80	80	112	112	112	128	96	160	1320
hullings	64	64	64	64	64	64	0	80	80	80	80	80	112	112	112	128	96	160	1320
carlton	96	96	96	96	96	96	96	0	80	80	80	80	112	112	112	128	96	160	1320
seals	96	96	96	96	96	96	96	80	0	80	80	80	112	112	112	128	96	160	1320
port adelaide	144	144	144	144	144	144	144	144	144	144	144	144	0	80	80	80	80	160	1320
gold coast	128	128	128	128	128	128	128	128	128	128	128	128	80	0	80	80	80	160	1320
hawks	128	128	128	128	128	128	128	128	128	128	128	128	80	80	0	80	80	160	1320
adelaide	144	144	144	144	144	144	144	144	144	144	144	144	80	80	80	0	80	160	1320
essendon	112	112	112	112	112	112	112	112	112	112	112	112	80	80	80	80	0	160	1320
gem	112	112	112	112	112	112	112	112	112	112	112	112	80	80	80	80	80	0	160
negles	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	0
north	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
SUM	1608	1600	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320
AT 18-22	geelong	melbourne	sydney	collingwood	freo	brisbane	richmond	hullings	carlton	seals	port	gold coast	hawks	adelaide	essendon	gem	negles	north	SUM
geelong	0	16	80	80	64	40	32	64	96	64	96	96	128	128	128	144	112	160	1608
melbourne	16	0	80	80	64	40	32	64	96	64	96	96	112	112	112	128	96	176	1600
sydney	80	80	0	80	80	80	80	80	80	80	80	80	112	112	112	128	112	160	1320
collingwood	80	80	80	0	80	80	80	80	80	80	80	80	112	112	112	128	96	160	1320
freemantle	64	64	64	64	0	80	80	80	80	80	80	80	112	112	112	128	96	160	1320
brisbane	40	40	40	40	0	80	80	80	80	80	80	80	112	112	112	128	96	160	1320
richmond	32	32	32	32	32	0	80	80	80	80	80	80	112	112	112	128	96	160	1320
hullings	64	64	64	64	64	64	0	80	80	80	80	80	112	112	112	128	96	160	1320
carlton	96	96	96	96	96	96	96	0	80	80	80	80	112	112	112	128	96	160	1320
seals	96	96	96	96	96	96	96	80	0	80	80	80	112	112	112	128	96	160	1320
port adelaide	144	144	144	144	144	144	144	144	144	144	144	144	0	80	80	80	80	160	1320
gold coast	128	128	128	128	128	128	128	128	128	128	128	128	80	0	80	80	80	160	1320
hawks	128	128	128	128	128	128	128	128	128	128	128	128	80	80	0	80	80	160	1320
adelaide	144	144	144	144	144	144	144	144	144	144	144	144	80	80	80	0	80	160	1320
essendon	112	112	112	112	112	112	112	112	112	112	112	112	80	80	80	80	0	160	1320
gem	112	112	112	112	112	112	112	112	112	112	112	112	80	80	80	80	80	0	160
negles	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	0
north	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
SUM	1608	1600	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320

FIGURE 3.1 AFTER ROUND 22 DOMINANCE MATRIX

# AFTER 22 ROUNDS

The following dominance matrices show after m rounds, after m rounds squared, after m rounds transposed and finally after m rounds transposed and squared. This was used to calculate r1, r2 and lastly r to determine ranking position, through the formulas displayed earlier.

1	Name	r	Ranking	Actual Position after 22	Actual position after 23	Difference				
2	eeelong	620	1	1	1	0	DUE TO EQUAL R VALUES HIGHER RANKING WAS GIVEN TO TEAM HIGHER ON ACTUAL POSITION AFTER ROUND 22			
3	melbourne	620	2	3	2	0				
4	ydney	476	5	2	3	-2				
5	ollingwood	340	6	5	4	-2				
6	remantle	552	3	6	5	2				
7	brisbane	484	4	4	6	2				
8	ichmond	136	9	7	7	-2				
9	bulldogs	104	10	9	8	-2				
0	arlington	212	7	8	9	2				
1	it kilda	204	8	10	10	2				
2	port adelaide	-68	11	11	11	0				
3	old coast	-204	12	12	12	0				
4	hawthorn	-340	13	13	13	0				
5	adelaide	-536	16	14	14	-2				
6	essendon	-476	15	15	15	0				
7	zws	-340	14	16	16	2				
8	west coast	-892	17	17	17	0				
9	north	-892	18	18	18	0				
0										

# DISCUSSION

In the case of these results the most accurate representation was after 22 rounds, followed by 16 and finally 10. However due to the chaotic nature of the season after round 16 provided accurate results.

Discussing the reliability of this method is peculiar. Early in the season I would not trust this method as there are many factors including team chemistry and finding form etc. that come into play before a team's ability can be accurately shown. An example of this includes that 3 teams were inside the top 8 after round 10 and the eventual premiers who finished first were in 6<sup>th</sup> position. From a mathematical and statistical point of view I do feel like it can be reliable as long as each team's predicted ranking is taken with a grain of salt, for example after 10 rounds instead of assuming Geelong will finish 7<sup>th</sup> we can use the data to say, Geelong are on track to finish 7<sup>th</sup> at this given pace and therefore must change something tactically.

# Discussion 2.0

A limitation of the dominance matrix which is vital to AFL as it's a national level game is there is no way to account for home and away advantages. For example, its much harder to defeat Fremantle at their home ground compared to the MCG which is a Victorian home ground. Another limitation this cannot account for is injuries, coaching staff changes, and a plethora of other internal factors a team must face through a season. Lastly there is not any consideration of tactics that teams use simply are they successful or not which is not particularly useful data for coaching staff.

# REFERENCES

- Brodie, R. & Swift, S. (2009). *NewQMaths 11c* (3rd Ed.). (pp. 186–189). Qld. Nelson Cengage Learning.
- Walter, R., 2011. Dominance Matrices: Your Secret Weapon in Footy Tipping. *Vinculum*, 48(2), pp.8-9.