



An Improved Adjusted Plus-Minus Statistic for NHL Players

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Abstract

The plus-minus statistic for NHL players is meant to be a measure of a player's offensive and defensive abilities. However, a player's plus-minus is highly dependent on the team he plays for, the opponents he faces, and other variables out of his control, so it is not always a good measure of that player's individual contribution to his team. In this work, we develop an adjusted plus-minus statistic that attempts to estimate a player's individual contribution, independent of that player's teammates and opponents. We have modeled even strength, power play and shorthanded situations, and we are able to estimate a player's offensive and defensive contributions during those situations. Also, for those shifts that begin with a faceoff, we have accounted for the zone in which a shift begins.

□□□ vs. Adjusted □□□

	+/-	Adj +/-
Estimates offensive and defensive ability	yes	yes
Independent of box score stats	yes	yes
Adjusts for strength of teammates	no	yes
Adjusts for strength of opponents	no	yes
Accounts for the zone in which a shift starts	no	yes
Estimates EV, PP, SH situations separately	no	yes
Estimates offense and defense separately	no	yes
Removes empty net situations	no	yes
Includes penalties drawn and penalties taken	no	no
Includes shootouts	no	no

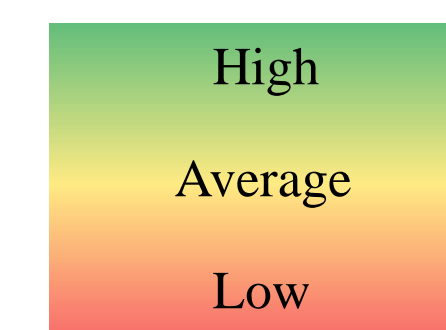
Notes

- Used a multiple linear regression model
- Data from detailed shift reports on NHL.com
- Data from 2007-08, 2008-09, 2009-10 seasons
- The results below are given in goals per season

Legend

Statistic	Meaning
OPM	Offensive Adj +/-
DPM	Defensive Adj +/-
APM	Adjusted +/-
AErr	Error in APM
Mins	Minutes Played

Color Codes



Even Strength

Top 10 Players in Even Strength Offense

Player	Team	Pos	OPM	DPM	APM	AErr	Mins
Pavel Datsyuk	DET	C	30.6	11.5	42.2	13.9	1200
Henrik Sedin	VAN	C	29.9	-12.4	17.5	18.3	1178
Alex Ovechkin	WSH	LW	29.7	1.4	31.1	15.3	1272
Sidney Crosby	PIT	C	27.8	-2.3	25.6	10.6	1063
Evgeni Malkin	PIT	C	24.6	-5.6	19.0	11.1	1172
Eric Staal	CAR	C	24.6	0.2	24.7	12.4	1168
Zach Parise	N.J.	LW	23.9	5.2	29.1	13.0	1176
Joe Thornton	S.J.	C	23.2	6.5	29.7	13.0	1228
Ilya Kovalchuk	N.J.	LW	22.3	-8.0	14.4	11.5	1198
Marian Gaborik	NYR	RW	21.4	8.3	29.7	9.0	865

Special Teams

Top 10 Players in Power Play Offense

Player	Team	Pos	OPM	DPM	APM	OErr	Mins
Nicklas Backstrom	WSH	C	26.5	2.7	29.2	5.8	312
Marc Savard	BOS	C	20.6	-3.4	17.1	5.4	244
Ray Whitney	CAR	LW	19.0	0.8	19.8	5.4	311
Andrei Markov	MTL	D	18.8	0.1	18.9	5.9	318
Mark Streit	NYI	D	18.3	2.7	20.9	6.0	390
Henrik Sedin	VAN	C	17.8	-1.5	16.3	10.5	309
Ryan Getzlaf	ANA	C	17.4	3.3	20.7	5.9	288
Nicklas Lidstrom	DET	D	17.4	-0.9	16.5	9.0	322
Brenden Morrow	DAL	LW	17.1	0.7	17.8	4.7	228
Jason Spezza	OTT	C	16.1	-2.8	13.3	6.3	296

Overall

Top 10 Players in Offense

Player	Team	Pos	OPM	DPM	APM	AErr	Mins
Henrik Sedin	VAN	C	47.8	-13.9	33.8	27.0	1487
Alex Ovechkin	WSH	LW	38.7	-1.5	37.2	22.3	1686
Pavel Datsyuk	DET	C	37.8	14.5	52.2	20.9	1602
Ryan Getzlaf	ANA	C	37.1	8.7	45.8	19.6	1426
Sidney Crosby	PIT	C	36.4	-2.8	33.6	16.5	1423
Jeff Carter	PHI	C	36.1	9.2	45.3	15.7	1511
Jonathan Toews	CHI	C	35.4	4.6	40.0	15.5	1377
Marc Savard	BOS	C	35.1	7.0	42.1	15.5	1176
Evgeni Malkin	PIT	C	34.2	-5.0	29.2	17.9	1564
Joe Thornton	S.J.	C	34.2	8.3	42.6	17.6	1547

Top 10 Players in Even Strength Defense

Player	Team	Pos	OPM	DPM	APM	AErr	Mins
Paul Martin	N.J.	D	-3.2	16.8	13.6	10.7	929
Mikko Koivu	MIN	C	13.3	16.4	29.7	11.9	1041
Jan Hejda	CBJ	D	1.6	16.3	17.9	13.4	1285
Willie Mitchell	VAN	D	-5.5	15.2	9.7	11.3	1193
Jason Pominville	BUF	RW	11.4	14.9	26.3	12.3	1059
Duncan Keith	CHI	D	11.2	14.7	26.0	17.1	1546
Nicklas Lidstrom	DET	D	6.8	14.3	21.1	17.0	1380
Andrew Greene	N.J.	D	-6.9	14.0	7.1	10.8	1013
Ryan Callahan	NYR	RW	1.6	13.9	15.5	8.9	882
Tomas Plekanec	MTL	C	1.1	13.6	14.7	11.8	1058

Top 10 Players in Shorthanded Defense

Player	Team	Pos	OPM	DPM	APM	DErr	Mins
Alex Burrows	VAN	LW	3.0	12.0	15.0	4.1	219
Chris Kelly	OTT	C	-2.6	11.7	9.1	4.6	256
Daniel Alfredsson	OTT	RW	2.4	9.7	12.1	3.3	171
Mike Weaver	STL	D	0.8	9.1	9.9	3.4	183
Nick Schultz	MIN	D	0.2	8.2	8.5	5.4	237
Eric Brewer	STL	D	-2.5	8.0	5.5	3.3	191
Barret Jackman	STL	D	0.2	7.8	8.0	4.5	287
Martin Skoula	N.J.	D	-1.1	7.7	6.5	3.5	159
Vernon Fiddler	PHX	LW	-0.4	7.6	7.2	3.7	211
Zdeno Chara	BOS	D	-2.7	7.5	4.8	4.3	249

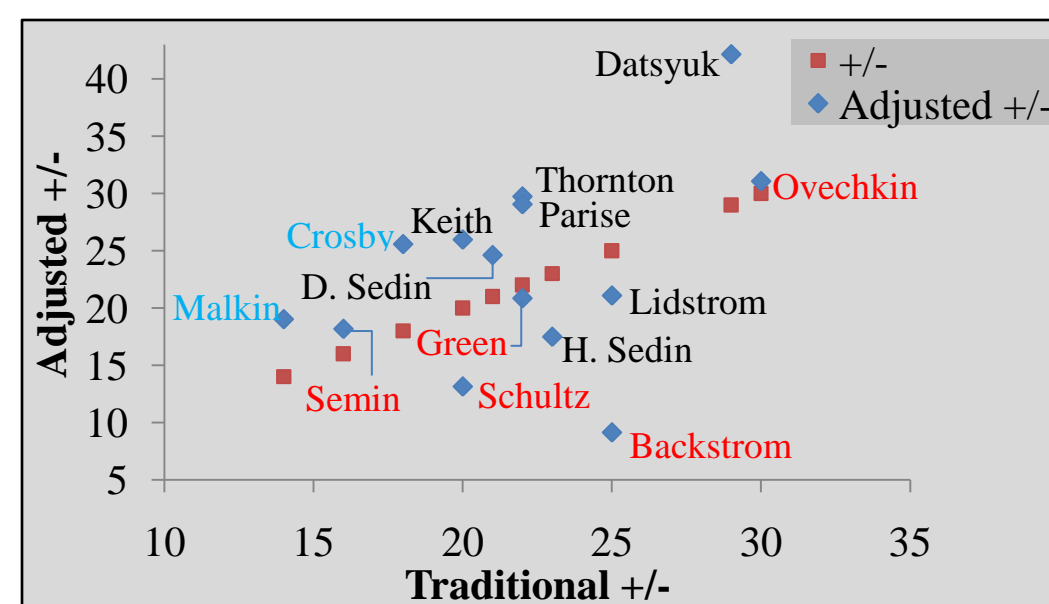
Top 10 Players in Defense

Player	Team	Pos	OPM	DPM	APM	AErr	Mins
Alex Burrows	VAN	LW	18.9	21.3	40.2	13.3	1252
Jan Hejda	CBJ	D	0.4	20.7	21.1	16.6	1564
Duncan Keith	CHI	D	15.9	19.7	35.6	21.7	2029
Mike Weaver	STL	D	-11.9	19.0	7.1	10.9	1007
Jay Bouwmeester	CGY	D	-19.2	17.8	-1.4	18.3	2141
Tobias Enstrom	ATL	D	-10.5	17.3	6.8	21.3	1886
Paul Martin	N.J.	D	-2.7	16.6	14.0	14.8	1288
Nicklas Lidstrom	DET	D	23.4	16.5	39.8	25.9	1966
Willie Mitchell	VAN	D	-9.3	16.3	7.0	14.7	1469
Tomas Plekanec	MTL	C	4.9	16.0	20.9	16.3	1450

Top 10 Players at Even Strength Overall

Player	Team	Pos	OPM	DPM	APM	+/-	Min
Pavel Datsyuk	DET	C	30.6	11.5	42.2	29	1200
Alex Ovechkin	WSH	LW	29.7	1.4	31.1	30	1272
Joe Thornton	S.J.	C	23.2	6.5	29.7	22	1228
Mikko Koivu	MIN	C	13.3	16.4	29.7	9	1041
Marian Gaborik	NYR	RW	21.4	8.3	29.7	15	865
Zach Parise	N.J.	LW	23.9	5.2	29.1	22	1176
Martin St. Louis	T.B.	RW	19.3	7.4	26.6	1	1297
Mike Richards	PHI	C	14.5	12.0	26.5	5	1089
Jason Pominville	BUF	RW	11.4	14.9	26.3	11	1059
Duncan Keith	CHI	D	11.2	14.7	26.0	20	1546

Comparing □□□ and Adjusted □□□



Top 10 Players Overall

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