

TOPIC

"The Russian-American War"

Part 1

Since 1945, the fear of complete destruction - due to nuclear weapons - and of nonexistence has postponed and outmoded a direct confrontation between the two superpowers and Lenin's prophecy of the inevitable war between communism and capitalism.

Yet "war has become neither anachronistic nor obsolete."¹ "War, Sun Tzu wrote, is a matter of vital importance to the state; the province of life or death; the road to survival or ruin."² And "...everything is subject to a supreme law which is the decision by arms."³

In our nuclear era, deterring is the magic word. "Deterrence is concerned with influencing the choices that another party will make, and doing it by influencing his expectations of how we will behave."⁴ "To some analysts the failure of nuclear deterrence between the superpowers would almost surely be catastrophic, perhaps resulting in a "nuclear winter."⁵

In this paper, it is attempted a hypothetical Russian-American Conflict as a game of Chicken. This analysis is based partly on intuition, mostly on the belief in "cyclical regulation"⁶ of human history and finally partly upon considerable rational⁷ theoretical and empirical literature in game theory,⁸ political theory and history.⁹ The predominant faith in historical repetitive cycles does not exclude the importance of the unique social and economic events and forces nor the personality of the leaders who have

to make the decisions.

Nevertheless, Thucydides tracking down another, extremely similar superpower war, the Peloponnesian War, wrote: "But I shall be satisfied if it be thought useful by those who wish to know the exact character of events now past which human nature being what it is, will recur in similar or analogous forums. (My history) has not been composed to court temporary applause but as a lasting possession."¹⁰

If history has a predictive power, then the outcome of the Peloponnesian War, is suggested here, would be parallel to a result of an American-Soviet military Conflict.

Before proceeding, let us reflect upon some striking resemblances between the two mentioned wars.

Russia has been a great power for many centuries, although her rivals have come and have gone. The USA became a superpower literally after the Second Great War as exactly Athens grew fantastically, in every term, after the Persian Wars.

Sparta, like the Soviet Union, had a very rigid political and economic system. In sharp contrast, Athens, and respectively the USA, had a liberal, democratic society.

Every Greek city-state had to take sides before and during the war. Alliances are equally important and firm at the present. Indeed, "...particularly striking is the fact that nearly 80% of the Great Power alliances were followed by Great Power War."¹¹

Finally, the actual outcome of the Peloponnesian War was the defeat of democratic Athens. The imaginative result of this superpower conflict is free to speculation.

Part 2

In describing the Russian-American War (RAW) as a two party, two choice game, no attempt is made to include all aspects of the conflict.

Clearly, other and diverse factors have significant influence. For instance, "...if we want to predict the future behaviour of the Soviet Union then the real problem is how much relative importance the Soviet government will actually give to the goal of increasing the standard of living of its own population, how much importance to various military objectives, and how much importance to helping communist parties abroad or to promoting nationalistic or socialistic revolutions in underdeveloped countries etc. It is reasonable to assume that the Russian government is in fact interested in all these policy goals at the same time. But what we do not know is how far it is willing to go in sacrificing any one of these objectives for the sake of another."¹²

The point of "the debate over domestic versus defense spending and the issue of whether a country should invest resources to maximize economic growth (and consequently social welfare) rather than appropriating those resources to maximize current military strength"¹³ is ignored completely.

Also "the consideration of internal domestic policy and unrest as a source of conflict"¹⁴ is overlooked.

However, it is assumed that both superpowers have well-defined national preferences, although in the case of the USA, in particular, this assumption violates the implications of the social choice theory and of the Arrow's General Impossibility Theorem which proves that intransitive national preferences are always possible in all political systems except a dictatorship.

In addition, it is assumed that "a conflict arises from the genuinely different (and sometimes opposite) interest of the players and not because these interests are irrational or pathological."¹⁵

But this game can not be considered as a two-person, zero-sum game, since both countries have at least some common interests. Moreover, "in game-theoretical terminology, if both nuclear powers had the capability of striking first but only one side had the capability of striking back after a nuclear attack, this would result in a dangerously unstable situation, which both sides have an interest to avoid."¹⁶

Finally, as usually happens in military conflicts, because both players have to make their strategy choices simultaneously and therefore, in ignorance of each other's choices, the game is one without perfect information. Similarly, we can not assume that one player is more clever than the other, but simply, as "most foreign policy decisions

are made by decision makers who carefully weigh the advantages and disadvantages likely to follow from alternative policies."¹⁷

Let's depict now the game of the two superpowers with mixed interests, where both players' interests are similar in some respects and dissimilar in others.

Every game with mixed interest can be played or can be portrayed both as a cooperative and as a non-cooperative game.

		USSR	
		Cooperate	Do Not Cooperate
USA	Cooperate	peace	indirect or limited war
	Do Not Cooperate	indirect or limited war	nuclear war

Figure 1 The RAW or 2 x 2 Matrix

At figure 1, we simply have the possible outcomes of the four particular choices of strategies made by the players.

The reward for the double or joint cooperative outcome or in other words the trust worthiness is peace. This result indicates both "individual rationality which prescribes to each player the course of action most advantageous to him under the circumstances, and collective rationality which prescribes a course of action to both players simultaneously."¹⁸

When the outcome is dictated by the individual

rationality of one of the players without satisfying a criterion of collective rationality, the consequence is limited war. "In fact, what we are dealing with in the case of limited war is tradition. We are dealing with precedent, convention, and the force of suggestion. We are dealing with the theory of unwritten law with convention whose sanction in the aggregate is the need for actual forbearance to avoid mutual destruction..."¹⁹

Lastly, the pure competitive selection produces a direct confrontation, a nuclear fireball and devastation.

In order to further analyze the structure of this matrix in game theoretic terms a measure of the utility of each of the four outcomes to each party is required.

It is very difficult to assign objective measurements of outcomes, although many methods exist. Sometimes these measures are given, sometimes are assigned arbitrarily, other times are found by polling methods, asking the individuals or groups concerned to describe the best and worst outcome they can imagine or anticipate etc.

Harsanyi²⁰ ambivalently states that one way is to "...infer (these numbers) on the basis of each country's past behaviour - including of course verbal behaviour on the part of its leading policy-makers."

Here, the payoffs, or numbers associated with the outcomes for each pair of strategies of the two players are given arbitrarily. However, when payoffs are specified on an

interval scale, they are called utilities. These "utilities indicate the degree of preference that players attach to outcomes."²¹

Furthermore, "of the two alternatives which give rise to outcomes, a player will choose the one which yields the more preferred outcome, or more precisely, in terms of the utility function he will attempt to maximize expected utility."²²

Again, in the context of the game of chicken, each player can choose between two strategies, cooperate (C) and (thus spending some money for defense purposes and the rest to economic growth objectives and) not cooperate ($\bar{C}$) which indicates three different possible outcomes which the players are assumed to rank from best (2) to worst (-5).

The chicken mechanism is "defined by the following outcome rankings of the strategy combination of the two players"²³:

- I. Both superpowers cooperate (CC) - second best outcome for both players.
- II. One player cooperates and the other does not ($C\bar{C}$ and $\bar{C}C$) - best outcome for the player who does not cooperate and second worst outcome for the player who does.
- III. Both nations do not cooperate ($\bar{C}\bar{C}$) - worst outcome for both players.

		<u>USSR</u>	
		C	$\bar{C}$
<u>USA</u>	C	(1, 1) Compromise	(-2, 2) Russian Victory
	$\bar{C}$	(2, -2) American Victory	(-5, -5) Nuclear War

Figure 2: Payoff Matrix of RAW

It is easy to see that the extreme choice ($\bar{C}$) is a dominating strategy for both players. The player though with the credible threat can force the other player to back down in order to avoid the nuclear disaster. In other words, transmittable threats to use military force become a prominent bargaining weapon, and sometimes can outgrow into the Pareto-optimal choice of (CC).

The outcomes ($\bar{C}C$) = (2, -2) and ($C\bar{C}$) = (-2, 2) are Nash equilibria, because "neither player would have an incentive unilaterally to depart from these outcomes because he would do worse if he did."²⁴ For example, from (2, -2) the USA would do worse if he moved to (1, 1), and the Soviet Union would do worse if he moved to (-5, -5).

Thus, every player by choosing $\bar{C}$, runs the chance to win but also risks disaster. On contrary, by choosing C, each might benefit from compromise but could also face defeat.

In addition, each of the Nash equilibria favours one player over the other, and the stability of these equilibria

as such says nothing about which of the two will be chosen. But, if history is a guide and if major wars are cyclical²⁵, and if we accept the similarities between the Peloponnesian War and this war, then the Russian victory outcome is well inclined.

Beyond this standard and intuitive reason, there are many elements which can initiate a war, but mathematically speaking "a necessary (not a sufficient) condition for initiating a war is that the gain in expected utility of winning the war should be greater than or at least equal to the expected loss involved in the case of defeat."²⁶ (Thus again, the $\bar{C}$ strategy is each player's best answer to the other's C strategy, but the C strategy is the best answer to the $\bar{C}$ strategy).

So, if this game is a nonnegotiable game, then each player chooses his strategies probabilistically. "A combination of such probabilistically chosen strategies, called mixed strategies, determines a probability distribution of the outcomes, hence also of the expected payoffs accruing to each player."²⁷

Suppose the USA chooses the mixture $(p, 1-p)$ respectively for $(C, \bar{C})$ strategies, and the USSR $(q, 1-q)$.

		<u>USSR</u>	
		C (q)	$\bar{C}$ (1-q)
<u>USA</u>	C (p)	(1, 1)	(-2, 2)
	$\bar{C}$ (1-p)	(2, -2)	(-5, -5)

Figure 3: The probabilistic payoff matrix

Then the expected payoff for the States will be:

$$\begin{aligned}
 EU_1 &= pq + (-2) p(1-q) + 2(1-p) q + (-5)(1-p)(1-q) \\
 &= pq - 2p(1-q) + 2q(1-p) - 5(1-p)(1-q) \\
 &= -4pq + 3p + 7q - 5 \\
 &= p(3-4q) + 7q - 5
 \end{aligned}$$

Similarly, the expected utility for Russia will be:

$$\begin{aligned}
 EU_2 &= pq + 2p(1-q) - 2(1-p)q - 5(1-p)(1-q) \\
 &= q(3-4p) + 7p - 5
 \end{aligned}$$

If now we assume that both countries are risk lovers, arrogant and confused that is, say, $p = q = 1/3$, the result is a possible negative outcome (-2.1), a permanent threat of nuclear war.

If both nations divide equally the probability of cooperation and non-cooperation, $p = q = 1/2$, the end again is bound to be negative (-1).

On the other hand, if the USA is reluctant to strike first, hence giving the advantage of the surprise attack to Russia, in other words if $p = 3/4$ and $q = 1/4$ the outcome is a Soviet victory, because $EU_1 = -1.75$ and $EU_2 = 0.25$. (The

outcome belongs to the CC cell).

Finally, if the Americans choose the strategy mixture $(p, 1-p) = (3/4, 1/4)$ and the Russians imitate them by choosing $(q, 1-q) = (3/4, 1/4)$ the outcome is an equilibrium position at $1/4$ for each player, "because the outcome (CC) is inaccessible if the two cannot coordinate their strategies."²⁸

Although, "in strictly competitive games it is impossible for the players to achieve mutual benefits by any form of cooperation, in non-zero-sum games such mutual gain is always a possibility."²⁹

"Conflicting parties enter negotiations if each hopes to gain from the results."³⁰

"Negotiations permit people to assess the preferences of others to ascertain their willingness to compromise if the threat of no agreement is real, and to measure each other's belief about these parameters."³¹

Although bargaining process includes threats, promises, commitments, bluffs etc., it allows the player to coordinate their actions in order to attain one of the preferred outcomes.

Several essential aspects of the bargaining problem become clear from a geometric representation of the payoff space.

At figure 4, the four outcomes are represented. The cooperative result lies in the positive section. In sharp

contrast, the nuclear fireball penetrates deeply into the abyss.

The Russian victory is depicted along the positive USSR payoff axis and the negative USA payoff axis.

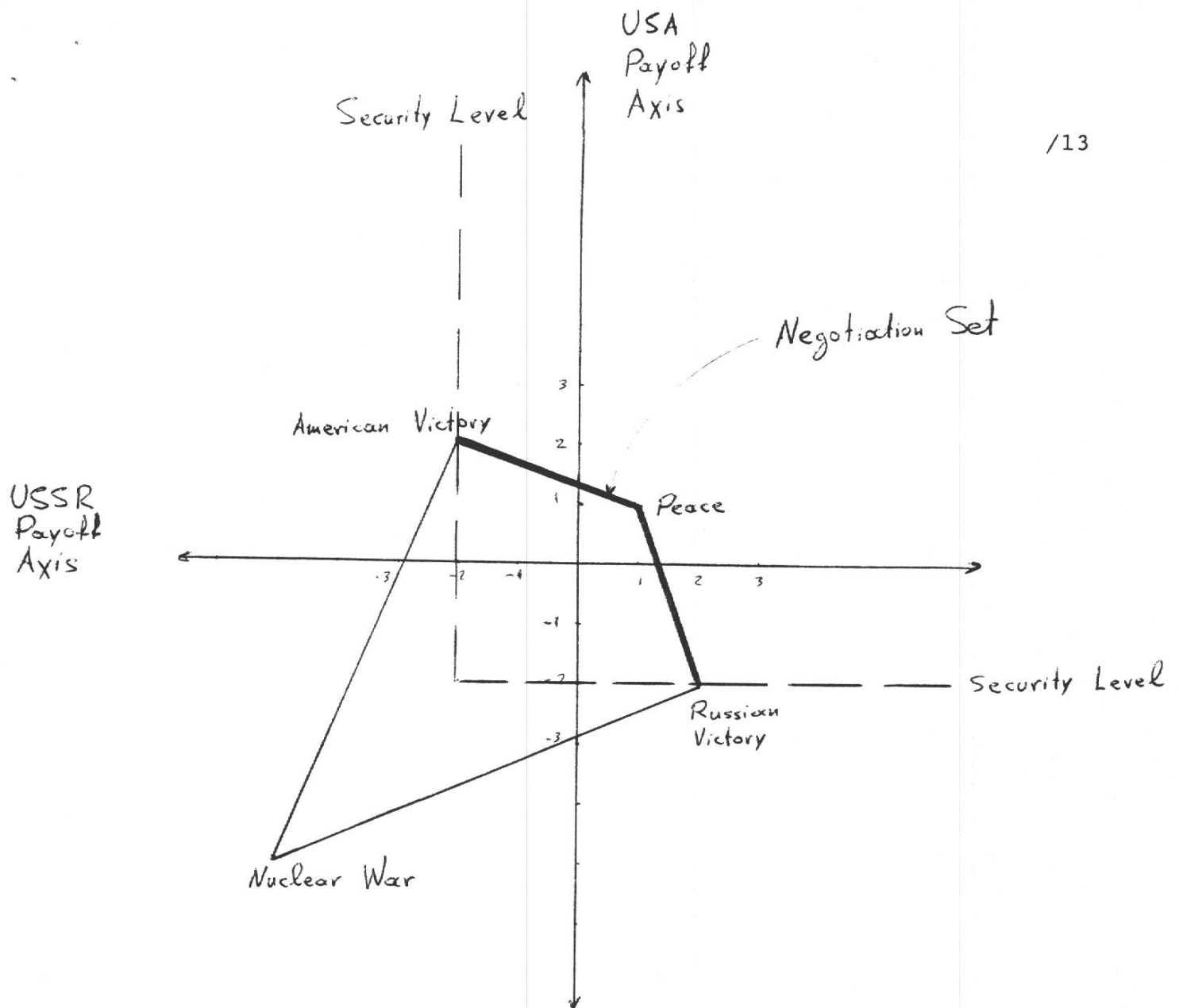


Figure 4: The Bargaining Space of the RAW

The security level for each country refers to the minimum payoff it can guarantee itself by choosing an appropriate mixed strategy and regardless of what the other country chooses.

In this RAW the security level is the defeat level (-2)

for both nations which is illustrated by the dotted line.

Needless to say, "a player need not accept any negotiated payoff which is less than his security level, for he can get that much without the cooperation of the other player."³²

Finally, the negotiation set is the boundary of the polygon above the security levels - that is, the outer boundary of the area of the payoff space where both players are better off than the minimum that they guarantee themselves.

Clearly, we can observe that the negotiation set is an isosceles triangle, and that peace is at the apex of this triangle. Furthermore, peace, being the highest joint payoff, gives an equal share to both countries. And the nuclear war lies far below the security levels.

As a result, if both countries are rational they will seek a solution on this boundary (heavy line).

But, "it is well known that in such situations so-called "rational" countries frequently have failed to reach an agreement, and the threats have had to be carried out, to their mutual discomfort."³³

In the same way, real players act not only according to rational considerations of the game theory type but also according to normative and other considerations. For instance, cooperation with the enemy may be regarded as treason rather than as a desirable norm, and negotiators are

faced with extremely powerful cross-pressures. These pressures are usually continually strengthened by extremist groups who seek to avoid a compromise at all costs, with powerful emotional reasons for doing so.

The result of this is that both nations might abandon the boundary and the possibility to make joint binding and enforceable agreements.

Part 3

For the purposes of this paper, many political, psychological, social and economic factors both within and beyond the two countries have been largely ignored.

The conflict between Russia and America has been represented as a two-person, non-zero-sum, mixed-motive game with the two players having both competitive and complementary interests.

In spite of the degree of simplification involved in this presentation, it essentially includes the basic elements of an imaginary Soviet-American war. If we enter the cyclical phenomenon of the human history this encounter is foreseeably accepted. But hopefully the rivals will continue to pursue cooperation aspects in order to achieve a Pareto-optimal solution.

"The "hot line" and other communication links between the superpowers, as well as pledges to inform the other side of future military exercises and not encrypt telemetry from missile tests, may be viewed as small steps intended to

defuse potential crises and decrease the probability of nuclear war."³⁴

But, because both countries are superpowers, can hardly accept any external pressure, any arbitration schemes by impartial outsider who will resolve the conflict by suggesting a solution.

Thus, it is thinkable and feasible for the players not to give up the conservative, dominating strategy with diverse results.

One of them the most favourable historically, is the Russian triumph.

This adopted outlook might be extremely pessimistic, yet intuitive and uncertain.

FOOTNOTES

- (1) Eban Abba, "The New Diplomacy, International Affairs in the Modern Age", Weidenfeld and Nicolson, London, 1983, p. 295.
- (2) Tzu Sun, "The art of war", Translated by S.B. Griffith, Oxford University Press, 1963, p. 63.
- (3) Clousewitz Carl Von, "On War" Introduction by A. Rapaport, p. 50.
- (4) Schelling Thomas C., "The strategy of conflict" Harvard University, 1960, 1980, p. 13.
- (5) Brams Steven J., and Kilgour Marc D., "Winding Down if Preemption or Escalation Occurs, A Game-Theoretical Analysis" Journal of Conflict Resolutions (J of CR), Vol. 31, No. 4, Dec. 1987, p. 548.
- (6) Thurow Lester, in the foreword of "The Great Depression of 1990", p. 13. Simon and Shuster, NY, 1987.
- (7) Thomas Schelling in the "Strategy of Conflict", p. 4, writes: "If we confine our study to the theory of strategy, we seriously restrict ourselves by the assumption of rational behaviour - not just of intelligent behaviour, but of behaviour motivated by a conscious calculation of advantages, a calculation that in turn is based on an explicit and internally consistent value system."
- (8) Steven J. Brams, in his book "Game Theory and Politics", states that "If there is anything that serious game theoretic analysts of international relations share, whatever their personal values, it is the assumption that actors in the international arena are rational with respect to the goals they seek to advance." Free Press, 1975, p. 2.
- (9) McClelland Peter D., "Causal Explanation and Model Building in History, Economics and the New Economic History", Cornell University Press, 1975.
- (10) Thucydides "The Peloponnesian War" Modern Library College Editions, 1951. Translated by John H. Finley, Jr., p. ix.
- (11) Levy, Jack S., "Alliance formation and War Behaviour." J of CR, Vol. 25, No. 4, Dec. 1981, p. 604.

- (12) Harsanyi, J.C., "Game theory and the Analysis of International Conflict" in Australian Journal of Politics and History, Dec. 1965, p. 293.
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- (14) Niou E.M.S. and Ordeshook P.C. "A theory of the balance of Power in International Systems" J of CR, Vol. 30, No. 4, Dec. 1986, p. 712.
- (15) Brams, Steven J. "Game Theory and Politics" The Free press, 1975, p. xv.
- (16) Harsanyi, J.C. opt. p. 303.
- (17) Brams, Steven J. opt. p. 2.
- (18) Rapaport Anatol (edited by) "Game theory as a theory of conflict resolution", D. Perdel Publishing Company, 1974, p. 18.
- (19) Schelling Thomas C. "The strategy of conflict" Harvard University Press, 1980, p. 260.
- (20) Harsanyi, J.C. opt. p. 294.
- (21) Brams Steven J. opt. p. 4.
- (22) Luce Duncan R. and Raiffa Howard, "Games and Decisions" John Wiley & Sons Inc., 1957, p. 50.
- (23) Brams Steven J. and Kilgour Marc D. "Winding Down the Preemption or Escalation Occurs" J of CR, Vol. 31, No. 11, Dec. 1987, p. 550.
- (24) Brams Steven J. and Kilgour Marc D. opt. p. 550.
- (25) Goldstein, Joshua S. "Long Waves in War, Production, Prices and Wages" New Empirical Evidence J of CR, Vol. 31, No. 11, Dec. 1987, p. 576. Moreover, Kondratieff in his book "The long Wave Cycle" 1928 pp. 81-82 argues that "in social and economic phenomena, there is nothing like strict periodicity" and that "...the regularity of long waves should refer not to periodicity but to the regularity of their repetition."

- (26) Nicholson Michael "Conceptual Vases of the War Trap" J of CR, Vol. 31, No. 2, June 1987 p. 347.
 Intriligator and Brito (J of CR, 1986, 28: 63-68) have put forward the idea that arms races inevitably lead to war. According to their model, the process of disarmament can also lead to war.
- (27) Rapaport Anatol, "Game theory as a theory of conflict revolution", p. 1.
- (28) Rapaport Anatol, "Two-person game theory" The essential ideas, The University of Michigan Press 1966, p. 139.
- (29) Luce and Raiffa, "Game and Decisions" p. 89.
- (30) Rapaport Anatol "Two-person game theory" 1966, p. 96.
- (31) Ordeshook P.C. "Game theory and political theory" Cambridge University Press, 1986, p. 477.
- (32) Rapaport Anatol, "Two-person game theory," 1966, p. 101.
- (33) Luce and Raiffo "Games and Decisions" p. 121.
- (34) Brams, S.J. and Kilgour M.D. "Winding down if Preemption or Escalation Occurs" J of CR, Vol. 31, Nov., Dec. 1987, p. 569.