# Attitudinal Analysis of Russia-Turkey Conflict with Chinese Role as a Third-Party Intervention

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**Abstract.** The presented attitude-based conflict analysis models the Russia-Turkey conflict with the third-party intervention of China. Third-party intervention model considers the attitudes of three decision makers (DMs) to understand the behaviors of the DMs in decision making in the situation of a strategic conflict. Three sets of attitudes of DMs are considered for attitudinal conflict analysis. The study traces out how the inappropriate (negative) attitudes of Russia and Turkey, regardless of third-party's attitude, would lead to unfavorable consequences. Even though the third-party, China, changes her attitude from neutral to positive, it would not affect the outcome. The attitudinal analysis reveals that the attitude of the focal decision maker, Russia, is important as the change in it influences the outcome of the conflict. The appropriate (positive) attitude of DMs would help resolve the conflict.

**Keywords:** Strategic conflicts · Attitudinal analysis · Third-party intervention
Russia · Turkey · China

## 1 Introduction

The interdependence of economies in the 21st century is unprecedented in the human history. The basis of this interdependence is rooted in the economic globalization and expansion in international trade. International trade has made possible the efficient utilization of the global resources and increased levels of well-being and higher levels of consumption. However, despite the interdependence of the countries conflicts are also inevitable. Any unprecedented event of strategic importance happening in one country can influence its relationship with other countries directly or indirectly at different magnitudes. In recent history, Russia-Turkey relations were affected by the Syrian crises. Even though Russia and Turkey shared good economic and diplomatic relations, they have conflicting national and strategic interests in Syria. Russian government supports current regime whereas Turkish government backs the rebels who try to oust Bashar al-Assad [1].

The situation worsened when Turkey shot down a Russian jet near Turkish-Syrian border [2–5]. Despite having good economic relations, this provoked tensions not only


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between the two countries but also among other adjacent countries which have diplomatic relations with Russia and Turkey. The shooting down of the Russian jet turned into a serious strategic conflict. Both countries showed aggressive behavior to each other. Russian reaction to this provocation could have had serious implications. The Russian-Turkish conflict could have been resolved by considering their attitudes toward each other. Moreover, the consideration of the attitude of any mediating country as a third-party intervention could have also helped resolve the Russia-Turkey conflict.

The resolution of a strategic conflict by using graph model for conflict resolution (GMCR) [6] is insightful as it systematically models a strategic conflict and provides deeper insight with less information as compared to other decision analysis approaches [6–8]. The GMCR is based on classical game theory [9] and the meta-game theory [10]. The behaviors of decision makers (DMs) have important implications on the nature of the conflict [7, 11, 12]. Inohara et al. [12] introduced attitude in the GMCR for the conflict analysis of the war of 1812 between the United States and the UK. However, Inohara et al. generated state prioritizations based on the states' considering attitudes of the DMs. It makes the state prioritization cumbersome when there is a large number of feasible states [7, 13]. Xu et al. [7] introduced attitude-based options to generate the ranking of the states. Matrix representation of general GMCR was introduced in [14–16]. Preference generation based on options makes it convenient to generate states' preferences. Moreover, the attitudinal stability definition presented in Inohara et al. [12] is logical. Walker et al. [17] converted logical attitude methodology into matrix form to improve the ease and efficiency of the attitudinal conflict analysis in the GMCR. Matrix representation provides extended flexibility to attitude calculations and helps encode attitude into a Decision Support System (DSS) [17].

There have been evolutions and improvements in DSS for the GMCR. The first DSS GMCR provided convenience for the use of the GMCR approach and its associated algorithms. DSS GMCR II [18, 19] allowed the users to create their own model to analyze a conflict. It opened the avenues of possibilities for the researchers and decision analysts to analyze complex conflicts in GMCR [17]. The matrix representation of the stability and solution concepts in the GMCR expanded the realm of applicability for the algebraic approach.

The MRCRDSS, based on matrix representation is useful in carrying out the individual stability analysis. The representation of attitudinal stability concepts has been introduced in the MRCRDSS [17]. It makes the incorporation and analysis of multiple decision makers' attitude while analyzing a conflict. The objective of the present study is to analyze the Russia-Turkey conflict while considering the mediating role of China. Moreover, the attitude of the DMs in a three DMs model is incorporated into the MRCRDSS. The study analyzes how the attitude of the intervening third-party may have impacted the outcomes of the conflict. Furthermore, the study also traces out how the attitude and changes in the attitudes of Russia and Turkey with the third-party intervention affected the nature and outcomes of the conflict.

The rest of the paper is structured as follows. Section 2 represents the GMCR and attitudinal stability concepts. Section 3 is comprised of the background of the Russia-Turkey conflict. The results of the stability analysis are summarized and discussed in Sect. 4. The conclusion of the analysis and policy implications is presented in Sect. 5.

## 2 Attitude-Based Conflict Analysis Under GMCR

### 2.1 The Graph Model for Conflict Resolution

A GMCR is a 4-tuple; $(\boldsymbol{K}, \boldsymbol{X}, (\boldsymbol{A_i})_{i\in \boldsymbol{K}}, \succ_i, \sim_i)$. Where K and X, respectively, are the set of all decision makers (DMs) ($|\boldsymbol{K}| \geq 2$) and the set of all states in a conflict. $(\boldsymbol{X}, \boldsymbol{A_i})$ is the DM $i$'s directed graph with the set of all vertices X and the set of all arcs, $\boldsymbol{A} \subset \boldsymbol{X} \times \boldsymbol{X}$, that are movements controlled by DM $i$ between the pair of states. DM $i$'s preferences on X are denoted by $(\succ_i, \sim_i)$ [6]. The DMs, in a conflict, make moves and counter-moves in order to do what they possibly could do. Therefore, a graph establishes a natural construct to model a conflict in which nodes represent the possible states and the arcs systematically keep track of a given DM's movements that he could make in one step.

For $i \in K$ and $x_1, x_2 \in X$, $x_1 \succ_i x_2$ implies that state $x_1$ is preferable to $x_2$ for DM $i$. Whereas, $x_1 \sim_i x_2$ means that the DM $i$ is indifferent between the two states. The relative preferences are assumed to be asymmetric reflexive, and complete. The preference $\succ_i$ is asymmetric if, for all $x_1, x_2 \in X$, $x_1 \succ_i x_2$ and $x_2 \succ_i x_1$ cannot hold simultaneously. However, $\sim_i$ is symmetric as $x_1 \sim_i x_2$ and $x_2 \sim_i x_1$ can hold simultaneously. Moreover, $(\succ_i, \sim_i)$ is complete as for all $x_1, x_2 \in X$, as one of $x_1, x_2 \in X$, $x_1 \succ_i x_2$, or $x_1 \sim_i x_2$ is true.

### 2.2 The Attitude of the DMs

The attitude of the DMs towards other DMs, in decision-making, plays a pivotal role in determining their preferences, moves, and counter-moves from one state to another [7, 12, 13]. It is a stable psychological attitude of an individual to particular person, event, idea, or emotion. The attitude contains a subjective evaluation of the individual and the preferences of the DMs, in a conflict, can be generated by subjective evaluation of DMs [7].

Owing to the importance of the attitudinal preferences of the DMs, Inohara et al. [12] considered three kinds of attitude in conflict analysis in their graph model. In recent studies [7, 13], the attitude-based prioritization is used to generate preferences of the states considering positive, negative, and neutral attitudes of the DMs. In option prioritization method, for $i, j \in K$, the DM $i$'s option statement is $O_i(i = 1, 2, \ldots, k)$. Under this option statement, the DM $i$'s *preference*, $P_i(i = 1, 2, \ldots, k)$, can be obtained. Before moving forward to attitudinal stability concepts some definitions [7] need to be summarized as follows:

*Definition 1: Option Statement with Positive Attitude:* For $i, j \in K$, $O_i(a_{ij} = +) = O_j$. Where $a_{ij}$ indicates the attitude of the DM $i$ towards the DM $j$. Having the positive attitude, the DM $i$'s option statement would be same as the DM $j$'s option statement.

*Definition 2: Option Statement with Negative Attitude:* For $i, j \in K$, $O_i(a_{ij} = -) = -O_j$. It implies that if DM $i$ has negative attitude for DM $j$ $(i.e.\, a_{ij} = -)$, her option statement would be opposite of the DM $j$'s option statement. That would not be beneficial for the DM $j$.

*Definition 3: Option Statement with Neutral Attitude:* For $i,j \in K$, $O_i(a_{ij} = 0) = I$. Where "*I*" stands for indifferent. It means if DM $i$ has a neutral attitude towards her opponent, she does not care about the option statement of the opponent.

*Definition 4: Attitude Preference:* According to the option statement, the attitude preference of DM $i$ $(T_{ij})$ can be obtained. For $i,j \in K$, and $x_1, x_2 \in X$, $x_2 \in T_{ij}(x_1)$ if and only if (IFF) $x_2 \succ_i x_1$ satisfies $T_{ij}$.

*Definition 5: Total Attitude Preference:* For $i,j \in K$, and $x_1, x_2 \in X$, $x_2 \in T_i^+(x_1)$ IFF $x_2 \in T_{ij}(x_1)$ for all $j \in K$. Total attitude preference of DM $i$ is the intersection of all her attitude preferences that she wants to reach.

*Definition 6: Set of Less or Equally Preferred States at Total Attitude:* The set of all less or the equally preferred states at total attitude for DM *i,* for $i \in K$, is $x_2 \in T_i^{-=}(x_1)$ *IFF* $x_2 \notin T_i^+(x_1)$.

*Definition 7: Reachable List:* The reachable list for DM $i$, for $i,j \in K$ and $x_1, x_2 \in X$, from state $x$ is the set $\{x_2 \in X | (x_1, x_2) \in A_i\}$. It can be symbolized as $R_i(x) \subset X$.

*Definition 8: Unilateral Improvement (UI) List:* The UI list for DM *I,* for $i,j \in K$ and $x_1, x_2 \in X$, is $x_2 \in T_i^*(x_1)$ IFF $x_2 \in R_i(x_1)$ and $x_2 \in T_i^+(x_1)$.

### 2.3 Attitude-Based Stability Definitions

*Definition 9: Relational Nash Stability (RNASH):* A state $x$ is RNASH stable for DM $i$ IFF there is no UI for her. Symbolically, for $i,j \in K$ and $x_1, x_2 \in X$, $x \in X_i^{RNASH}$ IFF $T_i^*(x) = \phi$. In this case, the DM $i$ has no incentive to move from state $x$.

*Definition 10: Relational General Metarationality (RGMR):* A state $x_1$ is RGMR for DM $i$, for $i,j \in K$, if for all $y \in T_i^*(x)$ and $R_i(y) \cap T_i^{-=}(x) \neq \phi$, denoted by $x \in X_i^{RGMR}$. In this case, the DM $i$ would not move to UI state at an attitude if keeping in mind her opponent could sanctions her move irrespective of benefit to herself.

*Definition 11: Relational Symmetric Metarationality (RSMR):* A state $x$ is RSMR, $x \in X_i^{RSMR}$, if for all $y \in T_i^*(x)$, there exists $z \in R_i(y) \cap T_i^{-=}(x)$ and $m \in T_i^{-=}(x)$ for all $m \in R_i(z)$. According to RSMR stability concept, if DM $i$ could not avoid sanction on her UI moves at an attitude by the opponent then she would not move from state $x$. This makes state $x$ RSMR stable for DM *i.*

*Definition 12: Relational Sequential Stability (RSEQ):* A state $x$ is RSMR, $x \in X_i^{RSEQ}$, if for all $y \in T_i^*(x)$, and $T_j^*(y) \cap T_i^{-=}(x) \neq \phi$. In RSMR, the DM $i$'s UI moves at attitude are sanctioned by DM $j$'s UI moves. The RSEQ is similar to RGMR except that the DM $i$ considers her own benefit at the time of sanction by her opponent.

### 2.4 Decision Support System MRCRDSS

The development of a decision support system (DSS) was necessary for the analysis of conflicts with multiple DMs. The MRCRDSS system was developed based on the

matrix representations of the GMCR [14–16] and attitudinal matrix representation [17]. The matrix representation of attitude in GMCR has made possible the encoding and therefore development of MRCRDSS for the attitudinal analysis of multiple decision maker conflict. The MRCRDSS is an efficient tool for the analysis. The attitudinal analysis in the present study with three decision makers has been carried out using this DSS.

## 3 Background of the Russia-Turkey Conflict

### 3.1 The Russia-Turkey Conflict

The relationship between Russia and Turkey goes centuries back and is complicated in nature. However, the economic and political relations between the two countries became strong after the end of the Cold War and with the emergence of globalization [20, 21]. Turkey has been ranked as the leading trading partner of Russia. In addition to this, Turkey became one of the best destinations for Russian tourists. Turkish business started to flourish in Russia. The politico-economic relations between the two countries became so pleasant that they instituted visa-free travel. But this economic edifice hampered with the conflicting interests over Syrian issue [21]. Turkey shot down a Russian fighter plane near the Turkish-Syrian border [2, 3, 21]. The Russian government showed an inflammatory reaction. Russia imposed heavy trade sanctions on Turkey coupled with a ban on Russian tourism. Moreover, Turkish business and investment in Russia were also adversely affected. Consequently, the situation became worse.

Russia proclaimed that the fighter jet was not in the Turkish airspace but the Turkish version was corroborated by the NATO. The Turkish government was seeking support from the US and the NATO on the issue [22]. The Russian government could have opted to investigate the matter and wait till the findings of investigations were unveiled. But the Russian government immediately imposed the sanctions on Turkey. The sanctions hit the Turkish trade, tourism and construction sectors, and exchanges that were benefitting Turkey. Turkish exports of vegetables and fruit were banned in Russia [23]. However, the Russian government did not reduce the gas supplies to Turkey that accounts for 55% of the total gas consumption [22] and 35% of oil [23]. Russia held Turkey responsible for the incident and demanded apology and payment of indemnities [22].

### 3.2 Chinese Government Intervention in the Russia-Turkey Conflict

The conflict had serious implications not only for both countries but also for the other countries in the region, especially China. The latter not only possesses greater strategic and economic power but also has strong economic and diplomatic relations with both countries. China could have played a very pivotal role in mediating the Russian-Turkey conflict. The present study models the Russian-Turkish conflict considering their attitude towards each other, while cogitating the intervening role of China as a third-party.

# 4 Attitudinal Conflict Analysis of the Russia-Turkey Conflict with Third-Party Intervention by China

## 4.1 Modeling of the Russia-Turkey Conflict with Third Party Intervention by China

*The DMs and Options of the DMs:* Due to direct participating nature, Russia and Turkey are deemed to be the major DMs in the conflict. Each decision maker has a set of options. Due to the capacity of the Chinese government as the mediator, a set of options was also considered in the analysis. So, there are three DMs in the conflict. When the DMs interact, these sets of options of the DMs are considered as the state strategies. The options of the DMs are summarized in Table 1. The Russian government has two options; to impose economic sanctions on Turkey or investigate further into the matter and then decide how to react against the opponent. The Turkish government also has two options, one is to apologize to Russia (The Russian government asked Turkey to categorically apologize and pay indemnities [22]). The second option is for Turkey to ask the US and the NATO for their support. However, China as the third-party in the conflict has the option to play its role as a mediator.

**Table 1.** Options of the DMs and the feasible states

| Russia | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Sanction | N | N | N | N | N | N | N | N | N | Y | Y | Y | Y |
| 2. Investigation | N | N | N | N | N | Y | Y | Y | Y | N | N | N | N |
| Turkey | | | | | | | | | | | | | |
| 3. Apologize | N | N | N | N | Y | N | N | N | N | N | N | N | N |
| 4. USA's help | N | N | Y | Y | N | N | N | Y | Y | N | N | Y | Y |
| China | | | | | | | | | | | | | |
| 5. Mediation | N | Y | N | Y | N | N | Y | N | Y | N | Y | N | Y |
| Label | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $x_5$ | $x_6$ | $x_7$ | $x_8$ | $x_9$ | $x_{10}$ | $x_{11}$ | $x_{12}$ | $x_{13}$ |

With three DMs in the modeled conflict and 5 options in total, mathematically, there are 32 states. But due to the mutually exclusive nature of some options and infeasibility of some states, the authors are left with the 13 feasible states. These states, for the sake of simplicity, are labeled as $x_1, x_2, \ldots, x_{13}$.

*Option Statements:* The options statements in Table 2 show that the Russian government prefers that Turkey apologize and therefore there will be no sanctions. The option statement, 3, −1, 5, 2, −4, describes the preferences of the Russian government from the most preferred to the least. However, Turkey wants Russia not to impose economic sanctions as it would adversely affect the Turkish economy. Turkish government does not like any further investigation into the matter. Chinese intervention for the resolution of the conflict is also the least preferred option for Turkey. China, the intervening third party, also prefers Turkish apology over economic sanctions.

**Table 2.** Options statement

| Russia | Turkey | China |
|---|---|---|
| 3 | −1 | 3 |
| −1 | −2 | −1 |
| 5 | −3 | −2 |
| 2 | 4 | −4 |
| −4 | 5 | 5 |

*Attitudes of the DMs:* The stability analysis of the feasible states has been carried out while considering different attitudes ($e$) of the DMs – Russia (R), Turkey (T), China (C). Three attitude matrices have been considered for the stability analysis:

$$Attitude\ Matrix - I = \begin{bmatrix} e_{RR} = + & e_{RT} = - & e_{RC} = 0 \\ e_{TR} = - & e_{TT} = + & e_{TC} = 0 \\ e_{CR} = 0 & e_{CT} = 0 & e_{CC} = + \end{bmatrix} \quad (1)$$

$$Attitude\ Matrix - II = \begin{bmatrix} e_{RR} = + & e_{RT} = - & e_{RC} = 0 \\ e_{TR} = - & e_{TT} = + & e_{TC} = 0 \\ e_{CR} = + & e_{CT} = 0 & e_{CC} = + \end{bmatrix} \quad (2)$$

$$Attitude\ Matrix - III = \begin{bmatrix} e_{RR} = + & e_{RT} = 0 & e_{RC} = 0 \\ e_{TR} = - & e_{TT} = + & e_{TC} = 0 \\ e_{CR} = + & e_{CT} = 0 & e_{CC} = + \end{bmatrix} \quad (3)$$

In the first attitude matrix (1), the attitude of the Russian government towards herself is positive, towards Turkey is negative and towards China is neutral. Whereas, the Turkish attitude towards herself is positive, towards Russia is negative, and towards China neutral. The negative attitude of Russia and Turkey towards each other is considerable because it is a matter of national integrity and sovereignty for both countries. From Turkey's point of view, Russian fighter jets intruded the Turkish airspace and violated the territorial integrity despite the warning by the Turkish air force [4, 5]. The Russian side argues that the jets were not in the Turkish territory rather they were in the Syrian territory throughout the mission and they did not violate the Turkish airspace; also that no warning was received from the Turkish side. So, the Russian government showed aggressiveness towards Turkey [2, 3, 5]. However, the Chinese government's attitude towards Russia and Turkey is considered neutral.

In the second attitude matrix (2), the attitudes of Russia and Turkey are considered the same but the attitude of the intervening third-party – China is considered to be changing from neutral to positive. The Chinese positive attitude towards Russia is also realistic because of the strong economic and strategic relations between China and Russia. These changes in Chinese attitudes are assumed to be neutral and/or positive in the assessment of the impact of attitude on the overall outcome of the conflict. The assessment of the impact of changes in the attitude of the third part may provide some insights.

In the third attitude matrix (3), the researchers used their freedom to hypothesize a change in Russian attitude from negative to positive towards Turkey. The positive attitude of the Russian government towards Turkey is considered here to analyze whether it affects the equilibrium outcome and helps to resolve the conflict.

### 4.2 Attitudinal Stability Analysis with Third-Party Intervention

*Stability Analysis with Attitude Matrix-I:* In the attitude matrix-I, it is assumed that Russia has a positive attitude for herself but a negative attitude for her opponent Turkey. On the other hand, Turkey has a negative attitude towards Russia and positive for herself. However, China's attitude is considered neutral for both of the opposing DMs Russia and Turkey. In this case, the stability analysis results, shown in Table 3, unfold state $x_9$ and $x_{13}$ as equilibrium states. These states are relational stable under all the stability definitions considered in the analysis.

**Table 3.** Stability analysis with attitude matrix-I

| States | RNASH | | | | RGMR | | | | RSMR | | | | RSEQ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | T | C | Eq | R | T | C | Eq | R | T | C | Eq | R | T | C | Eq |
| $x_1$ | | | | | | √ | √ | | | √ | √ | | | √ | √ | |
| $x_2$ | | | √ | | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | |
| $x_3$ | | √ | | | | √ | √ | | | √ | √ | | | √ | √ | |
| $x_4$ | | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | |
| $x_5$ | √ | | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| $x_6$ | √ | | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| $x_7$ | √ | | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | |
| $x_8$ | √ | √ | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | | |
| $x_9$ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| $x_{10}$ | √ | | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| $x_{11}$ | √ | | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | |
| $x_{12}$ | √ | √ | | | √ | √ | | | √ | √ | | | √ | √ | | |
| $x_{13}$ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |

The state $x_9$ (NYNYY) implies that Russia does not impose the sanction against Turkey and wait until further investigations into the matter. In the meanwhile, Turkey seeks support from the US and other NATO members. In addition to this, China plays mediation role as a third party to resolve the conflict between Russia and Turkey. The equilibrium state $x_{13}$ (YNNYY) is a rather unfavorable outcome. This equilibrium strategy of the conflict implies that the Russian government imposes the sanctions on the Turkish economy. In the meanwhile, Turkish government seeks support from the US, NATO and China asks the two opponents to resolve the issue.

*Stability Analysis with Attitude Matrix-II:* In the second scenario, the attitudes of the Russian and Turkish governments for themselves and for the opponent are unchanged but the attitude of China – the third-party is changed from neutral to positive towards Russia. In this situation, the stability analysis results, shown in Table 4, reveal the same states as equilibrium states. This indicates that if the opposing decision makers do not change their attitude then change in the attitude of the intervening third party may not have a significant impact on the outcome of the conflict.

**Table 4.** Stability analysis with attitude Matrix-II

| States | RNASH | | | | RGMR | | | | RSMR | | | | RSEQ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | T | C | Eq | R | T | C | Eq | R | T | C | Eq | R | T | C | Eq |
| $x_1$ | | | | | | √ | √ | | | √ | √ | | | √ | √ | |
| $x_2$ | | | √ | | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | |
| $x_3$ | | √ | | | | √ | √ | | | √ | √ | | | √ | √ | |
| $x_4$ | | √ | √ | | √ | √ | √ | | √ | √ | √ | √ | | √ | √ | |
| $x_5$ | √ | | √ | | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ |
| $x_6$ | √ | | | | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ |
| $x_7$ | √ | | √ | | √ | √ | √ | | √ | √ | √ | √ | √ | | √ | |
| $x_8$ | √ | √ | | | √ | √ | √ | | √ | √ | √ | √ | √ | √ | | |
| $x_9$ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| $x_{10}$ | √ | | | | √ | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ |
| $x_{11}$ | √ | | √ | | √ | √ | √ | | √ | √ | √ | √ | √ | | √ | |
| $x_{12}$ | √ | √ | | | √ | √ | | | √ | √ | | | √ | √ | | |
| $x_{13}$ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |

*Stability Analysis with Attitude Matrix-III:* The stability analysis in the above two cases, while changing the attitude of the mediating third party, China, from neutral to positive towards Russia has no significant impact on the outcome of the conflict. In the third case, the authors analyze the stability of the states for each decision maker in the conflict considering the change of Russian attitude towards Turkey from negative to neutral. Moreover, the Turkish government's attitude towards Russia is unchanged (*i.e.* negative) and intervening third party's attitude towards Russia is positive but neutral towards Turkey.

The stability analysis results, with third attitude matrix, reveal state $x_8$ and $x_9$ as equilibrium states (see Table 5). The equilibrium state $x_8$ (NYNYN) describes the strategy in which the Russian government does not impose restrictions and sanctions on Turkish economy but awaits the findings of in-depth investigations. The only difference between the state $x_8$ and $x_9$ is that, in state $x_9$ China plays its intervening role in an effort to resolve the conflict.

**Table 5.** Stability analysis with attitude Matrix-III

| States | RNASH | | | | RGMR | | | | RSMR | | | | RSEQ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | T | C | Eq | R | T | C | Eq | R | T | C | Eq | R | T | C | Eq |
| $x_1$ | | | | | | √ | √ | | | √ | √ | | | √ | √ | |
| $x_2$ | | | √ | | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | |
| $x_3$ | | √ | | | | √ | √ | | | √ | √ | | | √ | √ | |
| $x_4$ | | √ | √ | | √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | |
| $x_5$ | √ | | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| $x_6$ | √ | | | | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | |
| $x_7$ | √ | | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | | √ | |
| $x_8$ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| $x_9$ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| $x_{10}$ | | | | | | √ | √ | | | √ | √ | | | √ | √ | |
| $x_{11}$ | | | √ | | | √ | √ | | | √ | √ | | | √ | √ | |
| $x_{12}$ | | √ | | | | √ | | | | √ | | | | √ | | |
| $x_{13}$ | | √ | √ | | | √ | √ | | | √ | √ | | | √ | √ | |

## 5 Conclusion

The present study models the Russia-Turkey conflict which was triggered by shooting down of Russian fighter jet by Turkish forces near Syrian-Turkish border. This incident put Russia and Turkey on the path of hostility that could escalate into military confrontation. The escalated confrontation between the two countries would not only have serious politico- economic and strategic implications affecting their own relations and economic ties but also the other countries in the region and other trading partners with these two economies. Conflicts need to be resolved to avoid undesirable and unfavorable outcomes. Conflict analysis while considering the behavior of decision makers and players could be helpful in understanding the decision-making behavior of the DMs and thereby in understanding the nature and evolution of the conflict. This conflict analysis is an attempt to analyze the Russia-Turkey conflict, by considering their attitudes towards each other and the third-party intervention by China in the framework of the GMCR. This study uses three attitude matrices to examine how different attitudes of DMs affect the outcome of the conflict.

The results of the attitudinal stability analyses unfold that when Russia and Turkey have a negative attitude towards each other, the equilibrium outcomes are not favorable. Even if the intervening third-party, China, changes her attitudes from neutral to positive for Russia (attitude matrix-II), the equilibrium outcomes are not different form the first attitude matrix. However, when the focal decision maker – Russia changes her attitude from negative to positive for Turkey and the intervening third-party, China, has positive attitude towards Russia, the equilibrium outcomes are more favorable. It implies that the attitudes of the DMs in the Russia-Turkey conflict are critical. The point worth noting is that the attitude of the third-party has no effect on the outcome of

the conflict unless the focal DM Russia changes her attitude. In this conflict, the attitude of the focal decision maker plays a pivotal role and a positive attitude of the Russian government towards Turkey could be helpful to diffuse the escalated situation and avoid economic repercussions.

## References


1. Stubbs, J., Solovyov, D.: Kremlin says Turkey apologized for shooting down Russian jet. Reuters, 27 June 2016. https://www.reuters.com/article/us-russia-turkey-jet/kremlin-says-turkey-apologized-for-shooting-down-russian-jet-idUSKCN0ZD1PR. Accessed 01 Nov 2018
2. Melvin, D., Marinez, M., Bilginsoy, Z.: Putin calls jet's downing 'stab in the back'; Turkey says warning ignored. CNN, 24 November 2015. http://www.cnn.com/2015/11/24/middleeast/warplane-crashes-near-syria-turkey-border/index.html. Accessed 11 Jan 2018
3. Melvin, D., Mullen, J., Bilginsoy, Z.: Tensions rise as Russia says it's deploying anti-aircraft missiles to Syria. CNN, 25 November 2015. http://www.cnn.com/2015/11/25/middleeast/syria-turkey-russia-warplane-shot-down/index.html. Accessed 11 Jan 2018
4. Naylor, H., Roth, A.: NATO faces new Mideast crisis after downing of Russian jet by Turkey. The Washington Post, 24 November 2015. https://www.washingtonpost.com/world/turkey-downs-russian-military-aircraft-near-syrias-border/2015/11/24/9e8e0c42-9288-11e5-8aa0-5d0946560a97_story.html?utm_term=.7251c00b23d3. Accessed 05 Jan 2018
5. BBC: Turkey's downing of Russian warplane - what we know. BBC News, 01 December 2015. http://www.bbc.com/news/world-middle-east-34912581. Accessed 02 Jan 2018
6. Fang, L., Hipel, K.W., Kilgour, D.M.: Interactive Decision Making: The Graph Model for Conflict Resolution. Wiley, New York (1993)
7. Xu, P., Xu, H., He, S.: Evolutional analysis for the South China sea dispute based on the two-stage attitude of Philippines. In: Schoop, M., Kilgour, D.M. (eds.) GDN 2017. LNBIP, vol. 293, pp. 73–85. Springer, Cham (2017). https://doi.org/10.1007/978-3-319-63546-0_6
8. Ali, S., Haiyan, X., Peng, X., Zhao, S.: The analysis of environmental conflict in Changzhou foreign language school using a hybrid game. Open Cybern. Syst. J. **11**, 94–106 (2017)
9. Neumann, V., Morgenstern, J.: Theory of Games and Economic Behavior. Princeton University Press, Princeton (1944)
10. Howard, N.: Paradoxes of Rationality. MIT Press, Cambridge (1971)
11. Kilgour, D.M., Hipel, K.W., Fang, L.: The graph model for conflicts. Automatica **23**(1), 41–55 (1987)
12. Inohara, T., Hipel, K.W., Walker, S.: Conflict analysis approach for investigating attitude and misperceptions in the war of 1812. J. Syst. Sci. Syst. Eng. **16**(2), 181–201 (2007)
13. Xu, H., Xu, P., Ali, S.: Attitude analysis in process conflict for C919 aircraft manufacturing. Trans. Nanjing Univ. Aeronaut. Astronaut. **34**(2), 1–10 (2017)
14. Xu, H., Kilgour, D.M., Hipel, K.W.: Matrix representation of solution concepts in graph models for multiple decision makers graphs. IEEE Trans. Syst. Man Cybern. A Syst. Humans **39**(1), 96–108 (2009)
15. Xu, H., Kilgour, D.M., Hipel, K.W., Kemkes, G.: Using matrices to link conflict evolution and resolution in a graph model. Eur. J. Oper. Res. **207**, 318–329 (2010)
16. Xu, H., Li, K.W., Hipel, K.W., Kilgour, D.M.: A matrix approach to status quo analysis in the graph model for conflict resolution. Appl. Math. Comput. **212**(2), 470–480 (2009)
17. Walker, S.B., Hipel, K.W., Xu, H.: A matrix representation of attitudes in conflicts. IEEE Trans. Syst. Man Cybern. Syst. **43**(6), 1328–1342 (2013)

18. Fang, L., Hipel, K.W., Kilgour, D.M., Peng, X.: A decision support system for interactive decision making - part I: model formulation. IEEE Trans. Syst. Man Cybern. C Appl. Rev. **33**(1), 42–55 (2003)
19. Fang, L., Hipel, K.W., Kilgour, D.M., Peng, X.: A decision support system for interactive decision making, part 2: model formulation. IEEE Trans. Syst. Man Cybern. C **33**(1), 56–66 (2003)
20. Kirisci, K.: Turkey and its post-Soviet neighborhood, vol. 112(756), p. 271 (2013)
21. Kirişci, K.: Order from chaos: The implications of a Turkish-Russian rapprochment, 08 October 2016. https://www.brookings.edu/blog/order-from-chaos/2016/08/10/the-implications-of-a-turkish-russian-rapprochement/. Accessed 05 Jan 2018
22. Özel, S.: The crisis in Turkish-Russian Relations. Center for American Progress 10 May 2016. https://www.americanprogress.org/issues/security/reports/2016/05/10/137131/the-crisis-in-turkish-russian-relations/. Accessed 05 Jan 2018
23. Skinner, A.: Grudge between Ankara and Moscow deepens in struggle for regional influence. CNBC 14 Mar 2016. https://www.cnbc.com/2016/03/14/turkey-v-russia-grudge-between-ankara-and-moscow-deepens-in-struggle-for-regional-influence.html. Accessed 02 Jan 2018