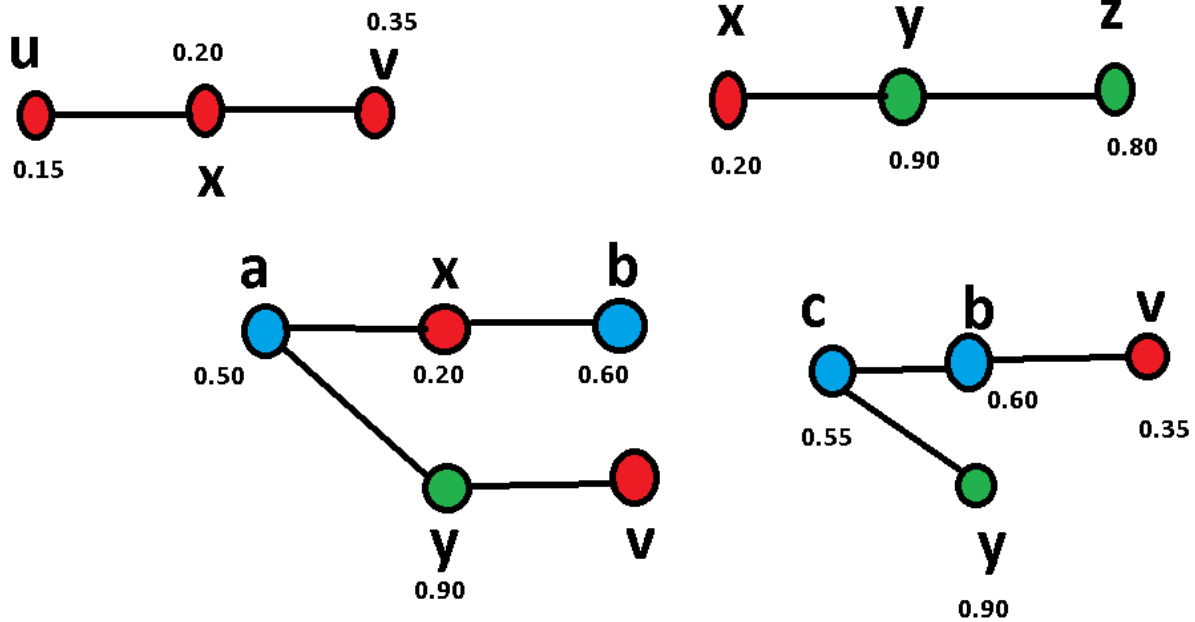# Report on EDGE HOMOGENEITY – 18th June

Example Figure 1

- Here in Example Fig 1 , alphabets which are shown are nodes with their corresponding probability score which lies from **0 ≤ϱ≤1**
- Red color indicates Against comment, Blue indicates Neutral comment and green indicates Probrexit comment.
- Now we calculate polarization based(2p-1) on nodes probability score
  σ =2ϱ−1

nodes	probability	Score σ = (2p-1)
a	0.5	0
b	0.6	0.2
c	0.55	0.1
u	0.15	-0.7
v	0.35	-0.3
x	0.2	-0.6
y	0.9	0.8
z	0.8	0.6

Table 1

- This polarization score σ is in the change of **-1 ≤ σ ≤1**
- From the user polarization score we calculate edge homogeneity ,for any edge e_{ij} between nodes i and j as "$\sigma_{ij} = \sigma_i * \sigma_j$"
- From the Example Fig 1 and Table 1 we will have detailed table 2

SourceNode	SourceScore	SourceStance	TargetNode	TargetStance	TargetScore	EdgeHomogeneity
a	0	Neutral	x	Against	-0.6	0
a	0	Neutral	y	Pro	0.8	0
c	0.1	Neutral	b	Neutral	0.2	0.02
c	0.1	Neutral	y	Pro	0.8	0.08
b	0.2	Neutral	v	Against	-0.3	0.06
u	-0.7	Against	x	Against	-0.6	0.42
x	-0.6	Against	v	Against	-0.3	0.18
x	-0.6	Against	y	Pro	0.8	-0.48
x	-0.6	Against	b	Neutral	0.2	-0.12
y	0.8	Pro	z	Pro	0.6	0.48
y	0.8	Pro	v	Against	-0.3	-0.24

Table 2

- From the Table 2, we can take 2 Cases in to the consideration as stated below

  Case1 : Source node is Neutral and Target node is different Stances for example as below

SourceNode	SourceScore	SourceStance	TargetNode	TargetStance	TargetScore	EdgeHomogeneity
a	0	Neutral	x	Against	-0.6	0
a	0	Neutral	y	Pro	0.8	0
c	0.1	Neutral	b	Neutral	0.2	0.02
c	0.1	Neutral	y	Pro	0.8	0.08
b	0.2	Neutral	v	Against	-0.3	-0.06

Table 3

- Similarly will take for other Source nodes as Against and ProBrexit.
- Case2 : Target Node is Against and Source node is different Stances for example as below

TargetNode	TargetStance	TargetSource	SourceNode	SourceScore	SourceStance	EdgeHomogeneity
x	Against	-0.6	a	0	Neutral	0
v	Against	-0.3	b	0.2	Neutral	0.06
x	Against	-0.6	u	-0.7	Against	0.42
v	Against	-0.3	x	-0.6	Against	0.18
v	Against	-0.3	y	0.8	Pro	-0.24

Table 4

- Similarly we will take other Tables for other Target Nodes as Neutral and ProBrexit

- Now, We take the Brexit dataset with 2000 discussion thread and taking smaller data frame with SubmissionID = "476nsv" as example

periods	Author	text	SubmissionID	ParentID	CommentID	leave_prob	polarizat	polarization_class
1	mateybuoy	Yes we could. I was wondering	476nsv	476nsv	d0atjlh	0.689236353	0.3784727	Brexit
1	rbnc	There's already enough anoyin	476nsv	476nsv	d0b0vrp	0.63600369	0.2720074	Neutral
1	Jaygernaughty	On Brexit could we create a ne	476nsv	NA	NA	0.611914449	0.2238289	Neutral
1	Jaygernaughty	It just seems like a natural trad	476nsv	d0b0vrp	d0cdh0l	0.086634585	-0.8267308	Against
1	zemafore	No we could not. Why would th	476nsv	476nsv	d0gr0rx	0.066711871	-0.8665763	Against
1	Jaygernaughty	To increase the size of our coll	476nsv	d0gr0rx	d0hxwnl	0.197004643	-0.6059907	Against
1	uB166ERu	again why would the others ev	476nsv	d0hxwnl	d0juf46	0.573485435	0.1469709	Neutral
1	Jaygernaughty	I'm sure before the EU everyor	476nsv	d0juf46	d0kj7oi	0.041607297	-0.9167854	Against
1	uB166ERu	I like your optimism.	476nsv	d0kj7oi	d0ko270	0.513247925	0.0264958	Neutral
1	Jaygernaughty	Yeah...I've been accused of see	476nsv	d0ko270	d0kp7mq	0.379472629	-0.2410547	Neutral
1	uB166ERu	Well to be honest I wish I was r	476nsv	d0kp7mq	d0kx9bb	0.573966174	0.1479323	Neutral
1	ChefBoyAreFuc	Ah, yes, Australia, Canada, and	476nsv	476nsv	d2g2g0r	0.5165146	0.0330292	Neutral
1	Jaygernaughty	I wouldn't let a little thing like	476nsv	d2g2g0r	d2j31et	0.696364724	0.3927294	Brexit

- We can see that starting of the discussion is from the Author – Jaygernaughty , where ParentID and CommentID is "NA"
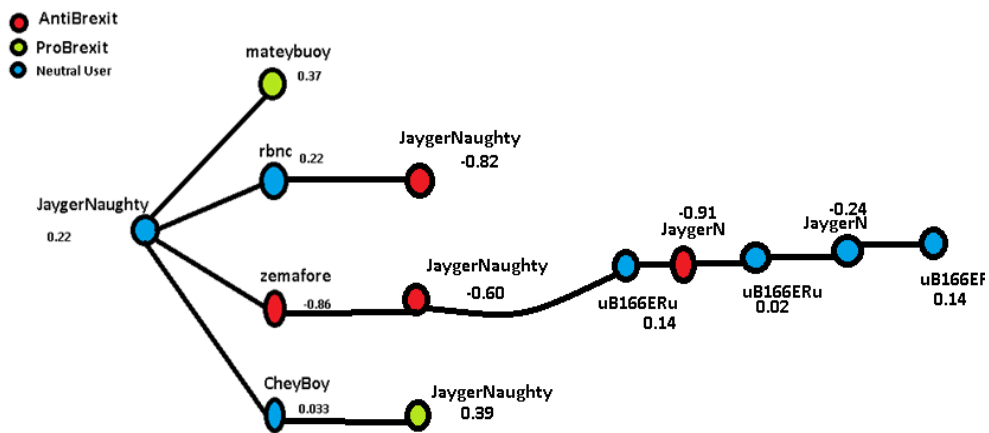- In Figure 2 , we can see the discussion thread flow

Figure2 – Example discussion thread – SubmissionID-476nsv

- In Order to get the data suited for the Figure 2 , we first take the root node author and first commenter author as one-set of data such as SubmissionID(SourceID) and ParentID(TargetID) are same in the Table 5.

Source	SScore	SStance	SourceID	TargetID	Target	TScore	TStance
Jaygernaughty	0.2238289	Neutral	476nsv	476nsv	mateybuoy	0.3784727	ProBrexit
Jaygernaughty	0.2238289	Neutral	476nsv	476nsv	rbnc	0.2720074	Neutral
Jaygernaughty	0.2238289	Neutral	476nsv	476nsv	zemafore	-0.8665763	AgainstBrexit
Jaygernaughty	0.2238289	Neutral	476nsv	476nsv	ChefBoyAreWeFucked	0.0330292	Neutral

Table 5 – Source Root Node with First Commenter Target Node

- For the other nodes we have ParentID and CommentID as same. So according this condition we take second-set of data as shown in Table 6.

Target	TScore	TStance	TargetID	Source	SScore	SStance	SourceID
Jaygernaughty	-0.82673083	AgainstBrexit	d0b0vrp	rbnc	0.27200738	Neutral	d0b0vrp
Jaygernaughty	-0.60599071	AgainstBrexit	d0gr0rx	zemafore	-0.86657626	AgainstBrexit	d0gr0rx
uB166ERu	0.14697087	Neutral	d0hxwnl	Jaygernaughty	-0.60599071	AgainstBrexit	d0hxwnl
Jaygernaughty	-0.91678541	AgainstBrexit	d0juf46	uB166ERu	0.14697087	Neutral	d0juf46
uB166ERu	0.02649585	Neutral	d0kj7oi	Jaygernaughty	-0.91678541	AgainstBrexit	d0kj7oi
Jaygernaughty	-0.24105474	Neutral	d0ko270	uB166ERu	0.02649585	Neutral	d0ko270
uB166ERu	0.14793235	Neutral	d0kp7mq	Jaygernaughty	-0.24105474	Neutral	d0kp7mq
Jaygernaughty	0.39272945	ProBrexit	d2g2g0r	ChefBoyAreWeFucked	0.03302920	Neutral	d2g2g0r

Table 6 – Source Node (CommentID) and TargetNode(ParentID)

- After re-ordering the columns in the Table6 we combine both Table 6 and Table 5 data to divide the cases as per Case1 and Case2
- Once we apply this application on reddit-brexit-dataset with 20000 discussion threads.
- Taking the Case1 – Scenario 1, were the Source Node as Neutral and Target Node which is combined with all the Stances. We can see the PDF of Edge Homogeneity of the Case1 – Scenario 1 in Figure3 which consists of 130240 edges in this plot.
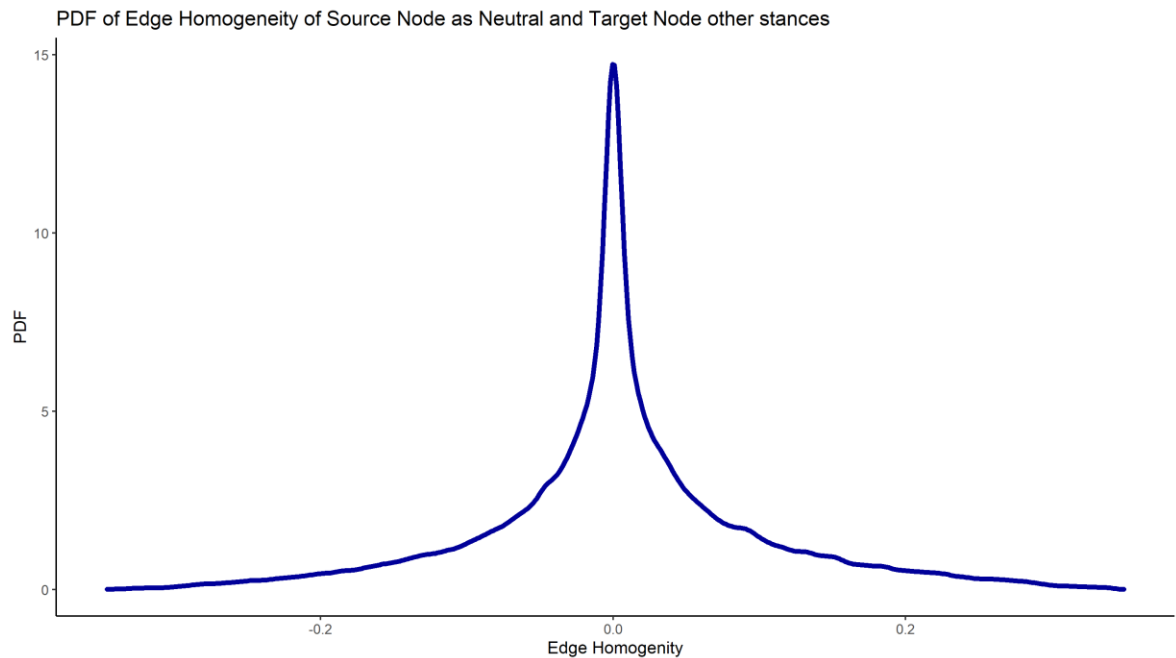

Figure 3 – PDF of Edge Homogeneity for source node as Neutral

- Taking the Case1 – Scenario 2, were the Source Node as Against and Target Node which is combined with all the Stances. We can see the PDF of Edge Homogeneity of the Case1 – Scenario 2 in Figure4 which consists of 106302 edges in this plot
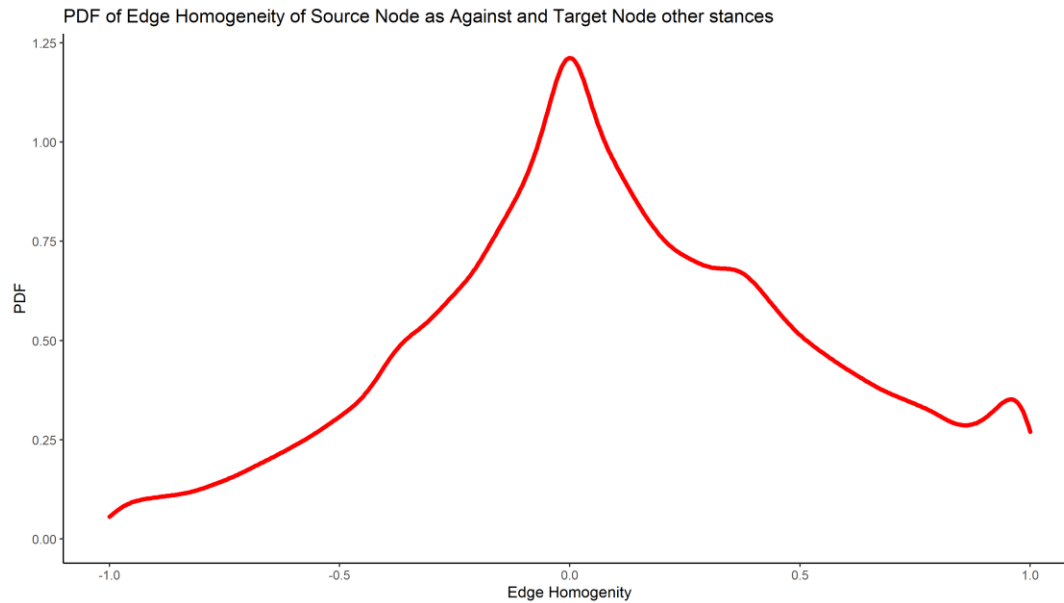

Figure 4– PDF of Edge Homogeneity for source node as Against

- Taking the Case1 – Scenario 3, were the Source Node as Pro Brexit and Target Node which is combined with all the Stances. We can see the PDF of Edge Homogeneity of the Case1 – Scenario 3 in Figure 5 which consists of 97945 edges in this plot
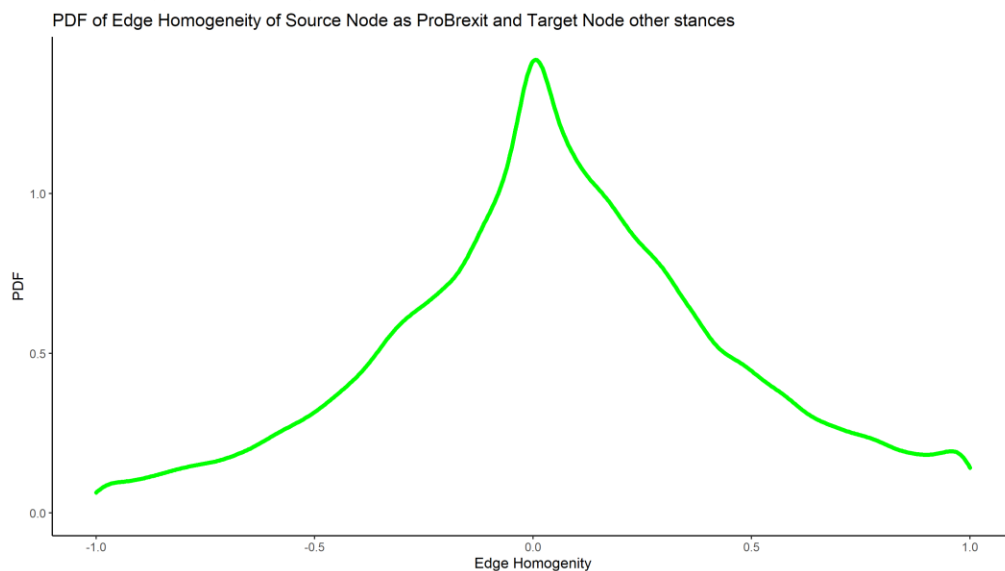

Figure 5 – PDF of Edge Homogeneity for source node as Pro Brexit

- Taking the Case2 – Scenario 1, were the Target Node as Neutral and Source Node which is combined with all the Stances. We can see the PDF of Edge Homogeneity of the Case1 – Scenario 1 in Figure6 which consists of 142693 edges in this plot
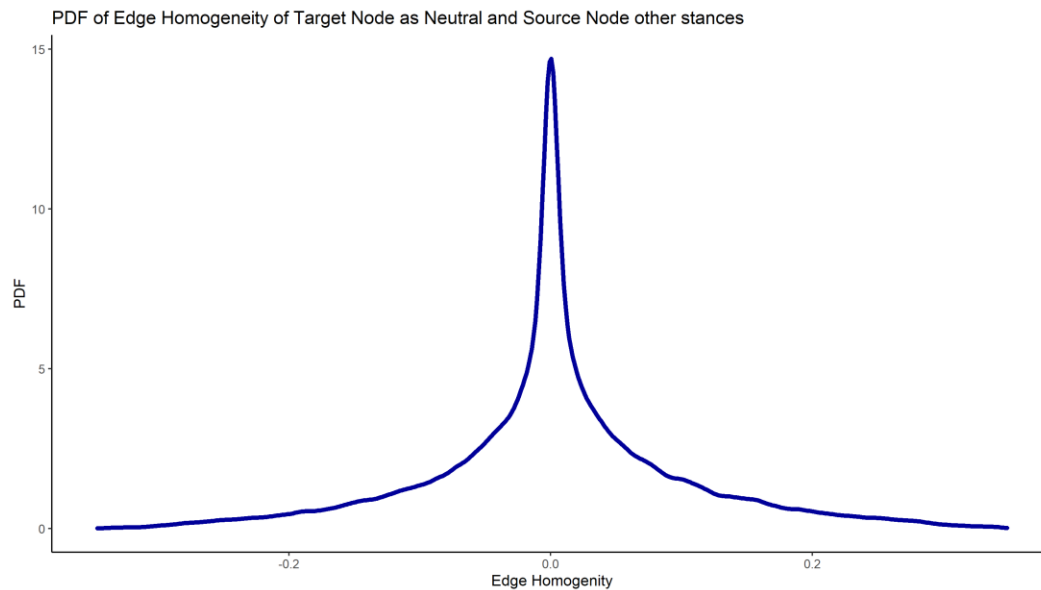
PDF of Edge Homogeneity of Target Node as Neutral and Source Node other stances

Figure 6 – PDF of Edge Homogeneity for Target node as Neutral

- Taking the Case2 – Scenario2, were the Target Node as Against and Source Node which is combined with all the Stances. We can see the PDF of Edge Homogeneity of the Case1 – Scenario 1 in Figure7 which consists of 96565 edges in this plot

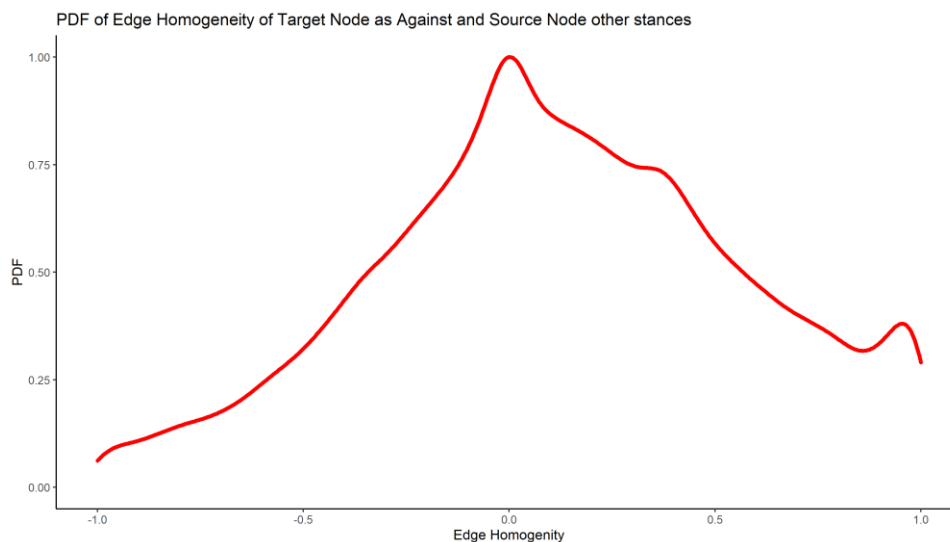PDF of Edge Homogeneity of Target Node as Against and Source Node other stances

Figure 7 – PDF of Edge Homogeneity for Target node as Against

- Taking the Case2 – Scenario3, were the Target Node as ProBrexit and Source Node which is combined with all the Stances. We can see the PDF of Edge Homogeneity of the Case1 – Scenario 1 in Figure8 which consists of 95229 edges in this plot
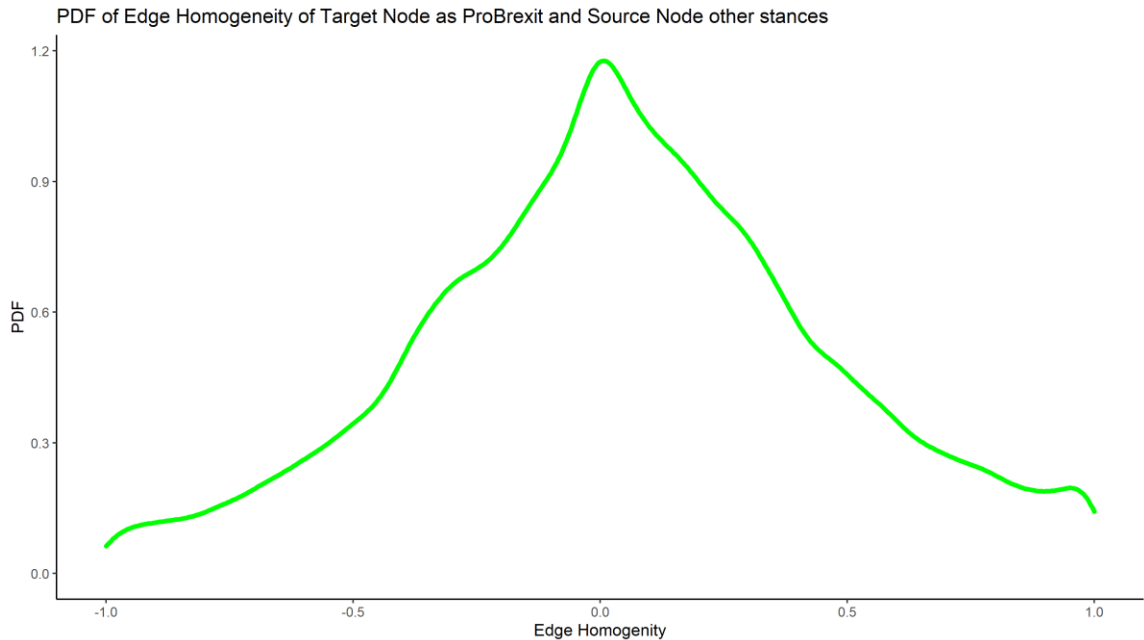

Figure 8 – PDF of Edge Homogeneity for Target node as ProBrexit

- We can see the pattern is almost similar as PDF of edge homogeneity for Source Node with Stances and the PDF of edge homogeneity for Target Node with Stances.