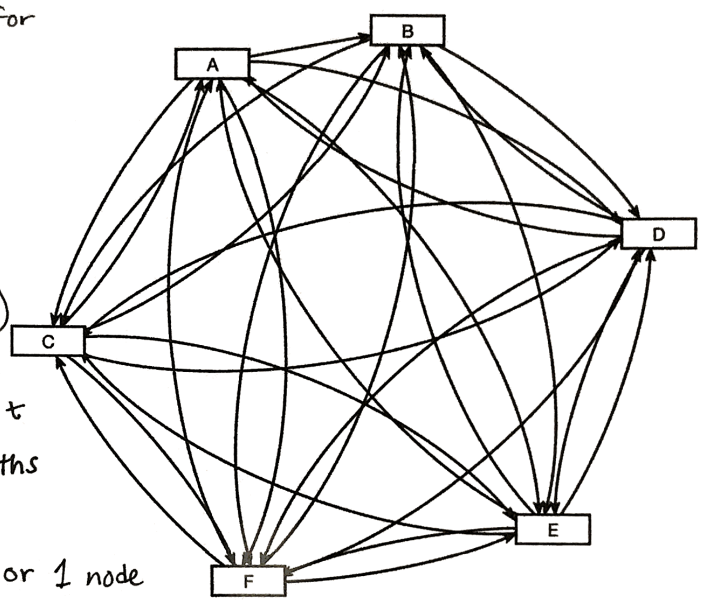
6 nodes - 29 edges

B → A broken

Going to trace betweeness centrality for node C; gephi says = 0.25



B now has to use C as a way to connect to A (can also use D, E, or F, all have same bc of 0.25)

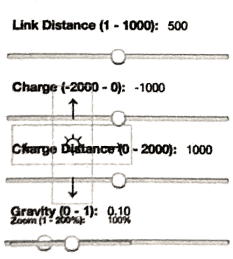
$$g(v) = \sum_{s \neq v \neq t} \frac{\sigma_{st}(v)}{\sigma_{st}}$$

σ_{st} = # shortest paths from s to t

$\sigma_{st}(v)$ is # paths through v

Because all nodes connected directly, or 1 node away, can go through systemically:

$v = C$



1) $s = A \quad t = B$

$\sigma_{st} = 1$; $A \to B$

$\sigma_{st}(v) = 0$

$\frac{\sigma_{AB}(C)}{\sigma_{AB}} = \frac{0}{1} = 0$

$s = A \quad t = D$

$\sigma_{st} = 1$; $A \to D$

$\sigma_{st}(C) = 0$

$\frac{\sigma_{AD}(c)}{\sigma_{AD}} = \frac{0}{1} = 0$

$s = A \quad t = E$

$\sigma_{st} = 1$; $A \to E$

$\sigma_{st}(v) = 0$

$\frac{\sigma_{AE}(c)}{\sigma_{AE}} = \frac{0}{1} = 0$

$s = A \quad t = F$

$\sigma_{st} = 1$; $A \to F$

$\sigma_{st}(v) = 0$

$\frac{\sigma_{AF}(c)}{\sigma_{AF}} = \frac{0}{1} = 0$

So; $\sum \frac{\sigma_{At}(c)}{\sigma_{At}} = 0$

2) $s = B \quad t = A$

$\sigma_{st} = 4$; $B \to C \to A$, $B \to D \to A$, $B \to E \to A$, $B \to F \to A$

$\sigma_{st}(v) = 1$; $B \to C \to A$

$\frac{\sigma_{BA}(c)}{\sigma_{BA}} = \frac{1}{4}$

$s = B \quad t = D$

$\sigma_{st} = 1$; $B \to D$

$\sigma_{st}(v) = 0$

$\frac{\sigma_{BD}(c)}{\sigma_{BD}} = \frac{0}{1} = 0$

$s = B \quad t = E$

$\sigma_{BE} = 1$; $B \to E$

$\sigma_{BE}(c) = 0$

$\frac{\sigma_{BE}(c)}{\sigma_{BE}} = \frac{0}{1} = 0$

$s = B \quad t = F$

$\sigma_{BF} = 1$; $B \to F$

$\sigma_{BF}(c) = 0$

$\frac{\sigma_{BF}(c)}{\sigma_{BF}} = \frac{0}{1} = 0$

So; $\sum \frac{\sigma_{Bt}(c)}{\sigma_{Bt}} = \frac{1}{4}$

3) $s = D \quad t = A$

$\sigma_{DA} = 1$; $D \to A$

$\sigma_{DA}(c) = 0$

$\frac{\sigma_{DA}(c)}{\sigma_{DA}} = \frac{0}{1} = 0$

$s = D \quad t = B$

$\sigma_{DB} = 1$; $D \to B$

$\sigma_{DB}(c) = 0$

$\frac{\sigma_{DB}(c)}{\sigma_{DB}} = \frac{0}{1} = 0$

$s = D \quad t = E$

$\sigma_{DE} = 1$; $D \to E$

$\sigma_{DE}(c) = 0$

$\frac{\sigma_{DE}(c)}{\sigma_{DE}} = \frac{0}{1} = 0$

$s = D \quad t = F$

$\sigma_{DF} = 1$; $D \to F$

$\sigma_{DF}(c) = 0$

$\frac{\sigma_{DF}(c)}{\sigma_{DF}} = \frac{0}{1} = 0$

So; $\sum \frac{\sigma_{Dt}(c)}{\sigma_{Dt}} = 0$

4) $s = E \quad t = A$

$\sigma_{EA} = 1$; $E \to A$

$\sigma_{EA}(c) = 0$

$\frac{\sigma_{EA}(c)}{\sigma_{EA}} = \frac{0}{1} = 0$

$s = E \quad t = B$

$\sigma_{EB} = 1$; $E \to B$

$\sigma_{EB}(c) = 0$

$\frac{\sigma_{EB}(c)}{\sigma_{EB}} = \frac{0}{1} = 0$

$s = E \quad t = D$

$\sigma_{ED} = 1$; $E \to D$

$\sigma_{ED}(c) = 0$

$\frac{\sigma_{ED}(c)}{\sigma_{ED}} = \frac{0}{1} = 0$

$s = E \quad t = F$

$\sigma_{EF} = 1$; $E \to F$

$\sigma_{EF}(c) = 0$

$\frac{\sigma_{EF}(c)}{\sigma_{EF}} = \frac{0}{1} = 0$

So; $\sum \frac{\sigma_{Et}(c)}{\sigma_{Et}} = 0$

5) $s = F \quad t = A$

$\sigma_{FA} = 1$; $F \to A$

$\sigma_{FA}(c) = 0$

$\frac{\sigma_{FA}(c)}{\sigma_{FA}} = \frac{0}{1} = 0$

$s = F \quad t = B$

$\sigma_{FB} = 1$; $F \to B$

$\sigma_{FB}(c) = 0$

$\frac{\sigma_{FB}(c)}{\sigma_{FB}} = \frac{0}{1} = 0$

$s = F \quad t = D$

$\sigma_{FD} = 1$; $F \to D$

$\sigma_{FD}(c) = 0$

$\frac{\sigma_{FD}(c)}{\sigma_{FD}} = \frac{0}{1} = 0$

$s = F \quad t = E$

$\sigma_{FE} = 1$; $F \to E$

$\sigma_{FE}(c) = 0$

$\frac{\sigma_{FE}(c)}{\sigma_{FE}} = \frac{0}{1} = 0$

So; $\sum \frac{\sigma_{Ft}(c)}{\sigma_{Ft}} = 0$

answer from Gephi ✓

So where $v = C$;

$$\sum_{s \neq v \neq t} \frac{\sigma_{st}(c)}{\sigma_{st}} = 0 + \frac{1}{4} + 0 + 0 + 0 = 0.25$$