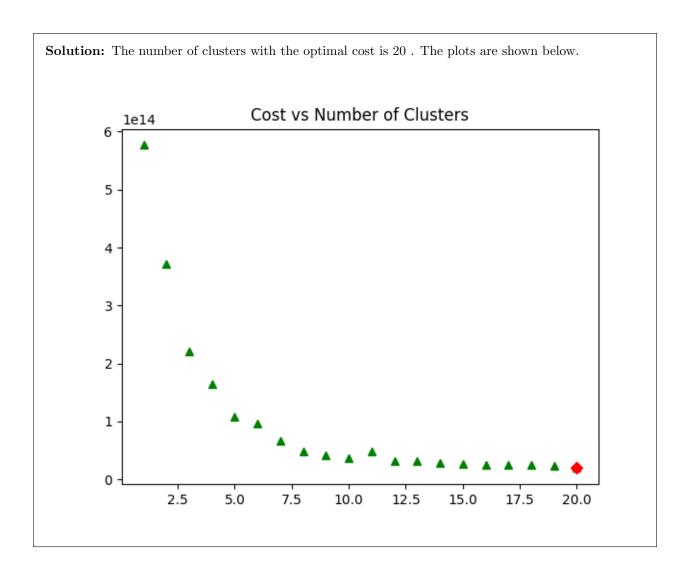
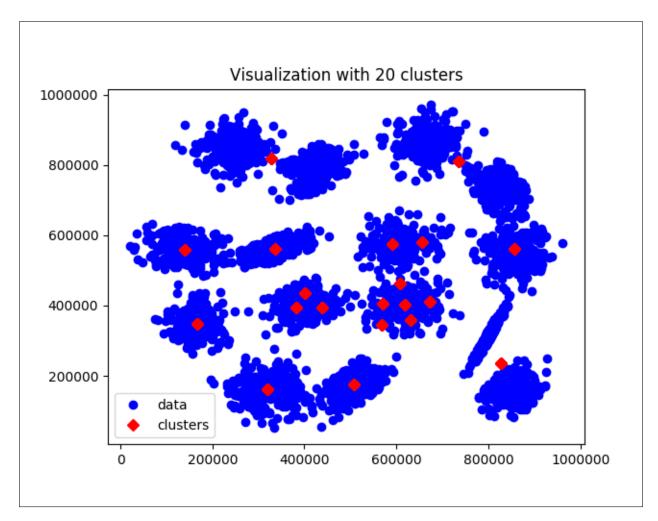
Homework 8

Hoang Chu

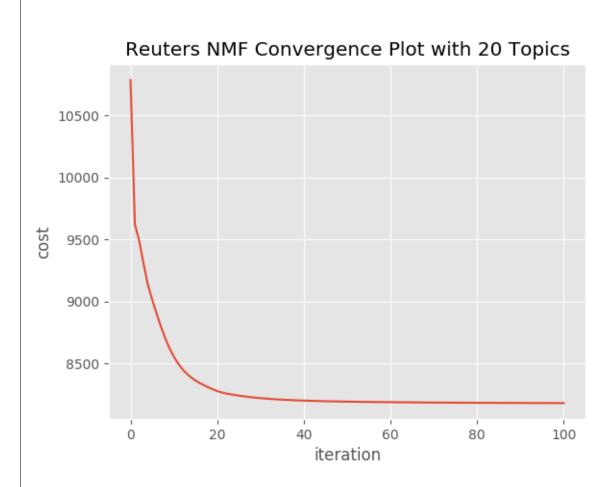
Problem 1.





Problem 2.

Solution: We chose to minimize the Frobenius norm between the approximation and the actual matrix, but it's equally okay to minimize the fake KL divergence objective they present in the paper. We also chose to use the multiplicative update because it's easier to implement and guarantees of the objective function being monotoic.



Most important words for each of the 20 topics:

```
- topic 1: ["loss" "vs" "revs" "shr" "4th" "year" "cts" "includes" "lt" "inc"]
- topic 2: ["rate" "pct" "bank" "prime" "rates" "to" "from" "banks" "effective" "cut"]
3 - topic 3: ["mln" "1986" "year" "from" "in" "and" "to" "1985" "tax" "extraordinary"]
- topic 4: ["fed" "customer" "says" "repurchase" "reserves" "federal" "agreements" "funds" "reserve"
"repurchases"
- topic 5: ["to" "the" "he" "trade" "that" "and" "said" "in" "would" "japan"]
- topic 6: ["000" "vs" "net" "cts" "sales" "avg" "shrs" "shr" "year" "revs"]
- topic 7: ["dlrs" "quarter" "share" "of" "earnings" "1987" "or" "net" "first" "1986"]
- topic 8: ["vs" "mln" "net" "shrs" "avg" "shr" "revs" "mths" "nine" "3rd"]
- topic 9: ["billion" "surplus" "deficit" "francs" "marks" "reserves" "deposits" "in" "trade" "account"]
- topic 10: ["profit" "vs" "loss" "net" "cts" "nil" "revs" "tax" "shr" "six"]
– topic 11: ["yen" "dollar" "bank" "japan" "dealers" "dollars" "the" "tokyo" "central" "currency"]
- topic 12: ["oil" "crude" "prices" "barrel" "opec" "50" "bbl" "gas" "bpd" "to"]
- topic 13: ["pct" "in" "february" "january" "rose" "year" "rise" "index" "1986" "december"]
– topic 14: ["oper" "excludes" "vs" "cts" "net" "shr" "discontinued" "or" "note" "gain"]
– topic 15: ["stg" "bank" "money" "market" "bills" "england" "band" "the" "assistance" "mln"]
- topic 16: ["tonnes" "wheat" "sugar" "corn" "87" "export" "for" "grain" "to" "ec"]
- topic 17: ["it" "of" "said" "shares" "to" "the" "stock" "its" "lt" "company"]
- topic 18: ["cts" "div" "qtly" "record" "april" "pay" "prior" "dividend" "vs" "sets"]
- topic 19: ["the" "of" "to" "in" "said" "and" "on" "by" "for" "was"]
```

-topic 20: ["cts" "vs" "shr" "qtr" "net" "1st" "revs" "inc" "4th" "lt"]