Qualitative Analysis

Comparison Table for Graph-1

Top 10 by Page Rank	Top 10 by In-link
International_Standard_Book_Number : 0.04773807149831716	International_Standard_Book_Number : 431
Digital_object_identifier : 0.03942139819089807	Tropical_cyclone : 373
International_Standard_Serial_Number : 0.030875853536724673	Digital_object_identifier : 355
National_Diet_Library : 0.02166428377223211	Bibcode : 247
Bibcode : 0.018309445413043333	Wayback_Machine : 245
PubMed_Identifier : 0.014808657743833699	National_Oceanic_and_Atmospheric_Administration : 224
World_War_II : 0.014785405457937434	Tropical_cyclone_scales : 217
Canada : 0.01448670795135248	Extratropical_cyclone : 204
Japan : 0.012995024649645364	National_Hurricane_Center : 199
OCLC : 0.01298240374730052	Pascal_(unit) : 192

Comparison Table for Graph-2

Top 10 by Page Rank	Top 10 by In-link
Virtual_International_Authority_File : 0.0233723051947205	International_Standard_Book_Number : 540
International_Standard_Book_Number : 0.02209057033214028	Turks_and_Caicos_Islands : 359
United_States : 0.01898804805686619	United_States : 352
Digital_object_identifier : 0.01768445013220414	United_Kingdom : 317
Integrated_Authority_File : 0.01449645579026693	Digital_object_identifier : 314
Wayback_Machine : 0.01198965538260767	Wayback_Machine : 295
International_Standard_Serial_Number : 0.009980454061209294	Integrated_Authority_File : 294
Biblioth%C3%A8que_nationale_de_France : 0.00957672880710886	Bermuda : 284
Canada : 0.00861283428528966	Geographic_coordinate_system : 284
United_Kingdom : 0.00842702375197125	Montserrat : 277

Speculation

When we examine the both the tables (given above) we find that some of the pages in Top 10 by page rank and Top 10 by In-Link are same.

- So, we come to general result that if pages have high in-links than they may have high ranks too.
- The above conclusion can easily be proved mathematically and conceptually.
    1. Mathematically:
        - As the page rank depends on 3 factors in our algorithm:
            1. Teleportation
            2. Page Rank of Sink Pages
            3. Share of PageRank in In-links
        - So,

            we can say if page rank be r so its calculated by
            $$r = x + y + z$$
            where,

            x denotes teleportation factor
            y denotes sink pages factor
            and z denotes in-link factor

        - The above formula clearly states r is directly proportional to z i.e. page rank is proportional to share of page rank.
        - And, we know share of page rank is summation of page ranks of in-links divided by total no of out-links of that in-links.
        - Know we can easily conclude that more no of in-links will result in higher summation result thus higher page rank.

    2. Conceptually:
        The page which has more no of in-links will have more no of chances of coming to it from different ways. More no of chances increases the probability of a user landing on that page. If a page is landed more times and is more probable then it will be ranked always higher as its most frequent choice of user. Also, if a page points to many number of pages its contribution in rank of a page to whom it is pointing get decreased. Hence the more number of out-links of a source page is a crucial factor in rack of a linked page. But only in-links and out-links only not contribute in page rank there are other factors to on which page rank solely depend so both columns have some similar values but not exact values.