1.1:

Query:

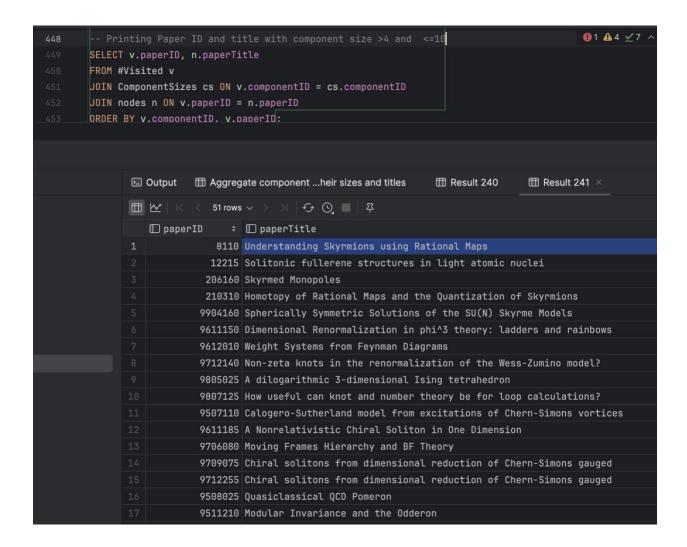
```
IF OBJECT ID ('tempdb..#Queue') IS NOT NULL DROP TABLE #Queue;
CREATE TABLE #Visited (
CREATE TABLE #Queue (
    DECLARE @CurrentComponentID INT = 1;
   DECLARE @CurrentPaperID INT;
    INSERT INTO #Queue
    SELECT TOP 1 paperID, @CurrentComponentID FROM nodes WHERE paperID NOT IN
   WHILE (SELECT COUNT(*) FROM #Queue) > 0
        SELECT TOP 1 @CurrentPaperID = paperID FROM #Queue;
        DELETE FROM #Queue WHERE paperID = @CurrentPaperID;
@CurrentPaperID)
            INSERT INTO #Visited (paperID, componentID) VALUES
(@CurrentPaperID, @CurrentComponentID);
            INSERT INTO #Queue (paperID, componentID)
            SELECT e.citedPaperID, @CurrentComponentID FROM edges e
```

```
WHERE e.paperID = @CurrentPaperID AND e.citedPaperID NOT IN
(SELECT paperID FROM #Visited)
            SELECT e.paperID, @CurrentComponentID FROM edges e
            WHERE e.citedPaperID = @CurrentPaperID AND e.paperID NOT IN
(SELECT paperID FROM #Visited);
        IF (SELECT COUNT(*) FROM #Queue WHERE componentID =
@CurrentComponentID) = 0
paperID FROM #Visited)) > 0
                INSERT INTO #Queue
paperID NOT IN (SELECT paperID FROM #Visited);
WITH ComponentSizes AS (
   SELECT componentID, COUNT(*) AS ComponentSize
FROM #Visited v
```

Output: total of 51 rows.

8110,Understanding Skyrmions using Rational Maps
12215,Solitonic fullerene structures in light atomic nuclei
206160,Skyrmed Monopoles
210310,Homotopy of Rational Maps and the Quantization of Skyrmions
9904160,Spherically Symmetric Solutions of the SU(N) Skyrme Models
9611150,Dimensional Renormalization in phi^3 theory: ladders and rainbows

```
9612010, Weight Systems from Feynman Diagrams
9712140, Non-zeta knots in the renormalization of the Wess-Zumino model?
9805025, A dilogarithmic 3-dimensional Ising tetrahedron
9807125, How useful can knot and number theory be for loop calculations?
9507110, Calogero-Sutherland model from excitations of Chern-Simons vortices
9611185, A Nonrelativistic Chiral Soliton in One Dimension
9706080, Moving Frames Hierarchy and BF Theory
9709075, Chiral solitons from dimensional reduction of Chern-Simons gauged
9712255, Chiral solitons from dimensional reduction of Chern-Simons gauged
9508025, Quasiclassical QCD Pomeron
9511210, Modular Invariance and the Odderon
9611025, Direct solution of the hard pomeron problem for arbitrary conformal
9802100, Solution of the Odderon Problem
9805135, New Results on the Odderon in QCD
9212110, Three Dimensional Chern-Simons Theory as a Theory of Knots and Links III
9312215, Knot invariants from rational conformal field theories
9401095, Chirality of Knots 9 {42} and 10 {71} and Chern-Simons Theory
9607030, Vassiliev Invariants for Links from Chern-Simons Perturbation Theory
9807155, Combinatorial Formulae for Vassiliev Invariants from Chern-Simons Gauge
9812105, Vassiliev Invariants in the Context of Chern-Simons Gauge Theory
304155, Exact String-like Solutions of the Gauged Nonlinear O(3) Model
9303080, Non-Abelian Chern-Simons Quantum Mechanics
9506015, Statistical Mechanics of Non-Abelian Chern-Simons Particles
9507015, Topological and Nontopological Solitons in a Gauged O(3) Sigma Model
9509135, Classical and Quantum Mechanics of Non-Abelian Chern-Simons Particles
9703185,N=2 Supersymmetric Gauged O(3) Sigma Model
9707150, Bogomolnyi Solitons and Hermitian Symmetric Spaces
9805010,On the Gauged Non-compact Spin System
7080, Relativistic scalar Aharonov-Bohm scattering
9402020, Perturbative Bosonic End Anyon Spectra and Contact Interactions
9411175, Aharonov-Bohm Scattering of a Localized Wave Packet: Analysis of the
9502105, FIELD THEORETICAL AND QUANTUM MECHANICAL DESCRIPTIONS OF COLLIDING AND
9510085, Calculation of the Aharonov-Bohm wave function
9603185, The Aharonov-Bohm scattering: the role of the incident wave
9703090, Perturbative Expansion in the Galilean Invariant Spin One-Half
9703200, The Low Energy Limit of the Chern-Simons Theory Coupled to Fermions
9710025,On the Nonrelativistic Limit of the Scattering of Spin One-half
9906170, Radiative Corrections to the Aharonov-Bohm Scattering
3255, Dimensional Transmutation and Dimensional Regularization in Quantum
5195, A differential equation approach for examining the subtraction schemes
9412050, Generalised Point Interactions for the Radial Schrodinger Equation via
9511010, The regulated four parameter one dimensional point interaction
9706070, Non-perturbative regularization and renormalization: simple examples
9904055, Finiteness following from underlying theory: a natural strategy
```



1.2:

Query:

```
DECLARE @convergenceThreshold FLOAT = 0.0001;
    DECLARE @totalNodes INT;
    DECLARE @initialPageRank FLOAT;
    DECLARE @danglingPageRank FLOAT;
    SELECT @totalNodes = COUNT(*) FROM nodes;
    SET @initialPageRank = 1.0 / @totalNodes;
    IF OBJECT ID ('tempdb..#pagerank') IS NOT NULL DROP TABLE #pagerank;
    CREATE TABLE #pagerank (
    SELECT paperID, @initialPageRank, 0 FROM nodes;
    IF OBJECT ID ('tempdb..#od') IS NOT NULL DROP TABLE #od;
    CREATE TABLE #od (
    INSERT INTO #od (paperID, outDegree)
    FROM edges
    WHILE @iteration < @maxIterations AND @change > @convergenceThreshold
        SELECT @danglingPageRank = SUM(pr.currentRank)
       LEFT JOIN #od od ON pr.paperID = od.paperID
        UPDATE #pagerank SET previousRank = currentRank;
            currentRank = (1.0 - @dampingFactor) / @totalNodes +
@dampingFactor * (
                @danglingPageRank / @totalNodes +
                    SELECT SUM(linkPR.currentRank / od.outDegree)
                    JOIN #pagerank linkPR ON e.paperID = linkPR.paperID
        FROM #pagerank pr;
        SELECT @change = SUM(ABS(pr.currentRank - pr.previousRank)) FROM
#pagerank pr;
    DECLARE @totalRank FLOAT;
```

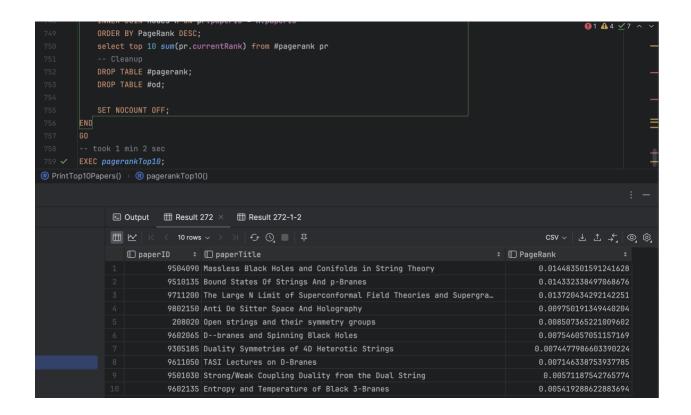
```
SELECT @totalRank = SUM(currentRank) FROM #pagerank;
UPDATE #pagerank SET currentRank = currentRank / @totalRank;

-- Returning top 10 PageRank values
SELECT TOP 10 n.paperID, n.paperTitle, pr.currentRank AS PageRank
FROM #pagerank pr
INNER JOIN nodes n ON pr.paperID = n.paperID
ORDER BY PageRank DESC;
select top 10 sum(pr.currentRank) from #pagerank pr
-- Cleanup
DROP TABLE #pagerank;
DROP TABLE #od;

SET NOCOUNT OFF;
END
GO
-- took 1 min 2 sec
EXEC pagerankTop10;
```

Solution:

9504090, Massless Black Holes and Conifolds in String Theory, 0.014483501591241628 9510135, Bound States Of Strings And p-Branes, 0.014332338497068676 9711200, The Large N Limit of Superconformal Field Theories and Supergravity, 0.013720434292142251 9802150, Anti De Sitter Space And Holography, 0.009750191349440204 208020, Open strings and their symmetry groups, 0.008507365221009602 9602065, D--branes and Spinning Black Holes, 0.007546057051157169 9305185, Duality Symmetries of 4D Heterotic Strings, 0.0074477986603390224 9611050, TASI Lectures on D-Branes, 0.007146338753937785 9501030, Strong/Weak Coupling Duality from the Dual String, 0.00571187542765774 9602135, Entropy and Temperature of Black 3-Branes, 0.005419288622883694



Total page rank: 1.0000000000000169

1.00000000000000169