(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

CORRECTED VERSION

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
8 April 2010 (08.04.2010)

PCT

(10) International Publication Number
WO 2010/039326 A8

(51) **International Patent Classification:**
G06F 7/60 (2006.01)

(21) **International Application Number:**
PCT/US2009/051029

(22) **International Filing Date:**
17 July 2009 (17.07.2009)

(25) **Filing Language:** English

(26) **Publication Language:** English

(30) **Priority Data:**
61/101,490 30 September 2008 (30.09.2008) US

(71) **Applicant** *(for all designated States except US)*: **EXXONMOBIL UPSTREAM RESEARCH COMPANY** [US/US]; CORP-URC-SW-359, P.O. Box 2189, Houston, TX 77252-2189 (US).

(72) **Inventors; and**
(75) **Inventors/Applicants** *(for US only)*: **MISHEV, Ilya** [US/US]; 3102 Emory Oak Ln, Pearland, TX 77584 (US). **NEPOMNYASHCHIKH, Sergey** [RU/RU]; 22 Tereshkova, Apt. 19, Novosibirsk, 630090 (RU). **MATSOKIN, Alexander** [RU/RU]; 20 Akademicheskay, Apt.1, Novosibirsk, 630090 (RU).

(74) **Agents:** **JENSEN, Nathan, O.** et al.; Exxonmobil Upstream Research Company, CORP-URC-SW-3, P.O. Box 2189, Houston, TX 77252-2189 (US).

(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

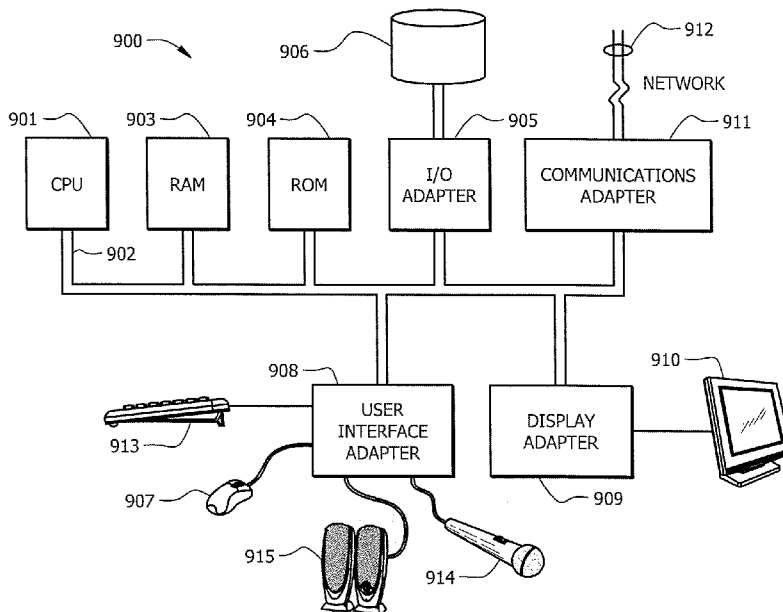(54) Title: SELF-ADAPTING ITERATIVE SOLVER

FIG. 9

(57) **Abstract**: A self-adapting iterative solver is provided that employs a self-adapting process for extracting singularities for solving linear systems of equations. The self-adapting iterative solver dynamically determines how to adapt its performance in the presence of one or more singularities encountered in a linear system of equations. In certain embodiments, the self-adapting iterative solver can identify possible singularities, and then analyzes its performance for adapting to a treatment of the possible singularities that provides a desired performance (i.e., for achieving convergence to a solution). Thus, rather than being pre-configured for providing a certain treatment of (e.g., eliminating) certain pre-identified singularities, in certain embodiments, the iterative solver adapts its treatment of singularities based on its computing performance.

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

— *with international search report (Art. 21(3))*

(48) Date of publication of this corrected version:

10 June 2010

(15) Information about Correction:
see Notice of 10 June 2010