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(54) 发明名称: 基于数字孪生与平行控制器的无人艇路径操纵控制系统与方法

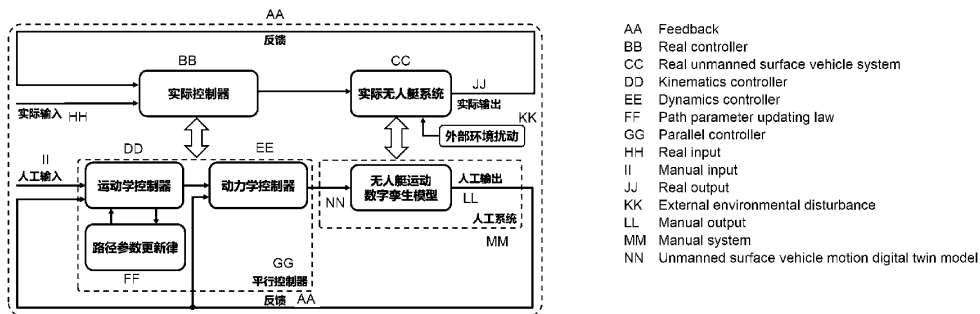


图 1

(S7) Abstract: An unmanned surface vehicle path manipulation control system and method based on a digital twin and a parallel controller. The system comprises: a real unmanned surface vehicle system, a real controller for generating a control input to control the real unmanned surface vehicle system, an unmanned surface vehicle motion digital twin model for generating location information of a virtual unmanned surface vehicle, a kinematics controller for generating an unmanned surface vehicle guidance signal, a dynamics controller for generating a control input on the basis of the guidance signal and speed information of the virtual unmanned surface vehicle at the current moment so as to control a manual system composed of the unmanned surface vehicle motion digital twin model, and a path parameter updating law providing an unmanned surface vehicle path parameter; a parallel controller integrates the constructed virtual unmanned surface vehicle system in an information space into the environment, and drives the virtual unmanned surface vehicle system and the real unmanned surface vehicle system at the same time, thereby realizing mutual mapping and virtual-real interaction between the two systems.

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BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW。

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根据细则4.17的声明:

— 发明人资格(细则4.17(iv))

本国际公布:

— 包括国际检索报告(条约第21条(3))。

(57) 摘要: 一种基于数字孪生与平行控制器的无人艇路径操纵控制系统与方法, 系统包括: 实际无人艇系统、生成控制输入对实际无人艇系统进行控制的实际控制器、生成虚拟无人艇的位置信息的无人艇运动数字孪生模型、产生无人艇制导信号的运动学控制器、根据制导信号和当前时刻虚拟无人艇的速度信息生成控制输入对由无人艇运动数字孪生模型构成的人工系统进行控制的动力学控制器、提供无人艇路径参数的路径参数更新律; 平行控制器将构建的信息空间中的虚拟无人艇系统融入环境, 同时驱动虚拟无人艇系统和实际无人艇系统, 实现两个系统之间的相互映射与虚实交互。