

# Supplementary Document for “Which Surrogate Works for Empirical Performance Modelling? A Case Study with Differential Evolution”

Ke Li<sup>1</sup>, Kay Chen Tan<sup>2</sup> and Tinkle Chugh<sup>1</sup>

<sup>1</sup>Department of Computer Science, University of Exeter

<sup>2</sup>Department of Computer Science, City University of Hong Kong

\*Email: {k.li, t.chugh}@exeter.ac.uk, kaytan@cityu.edu.hk

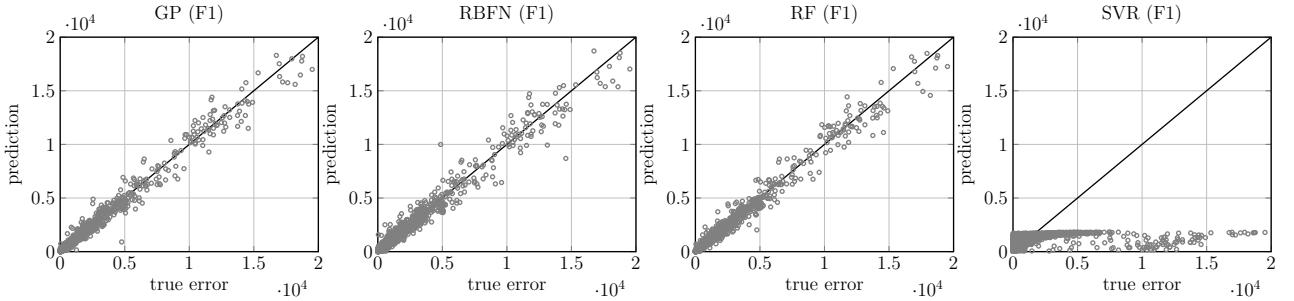


Figure 1: Visual comparison of models for performance predictions on previously unseen parameter configurations (F1 with  $d = 10$ ).

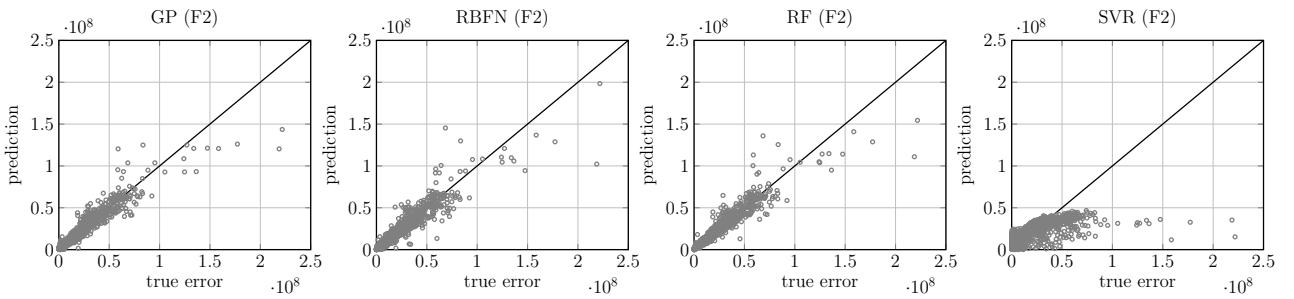


Figure 2: Visual comparison of models for performance predictions on previously unseen parameter configurations (F2 with  $d = 10$ ).

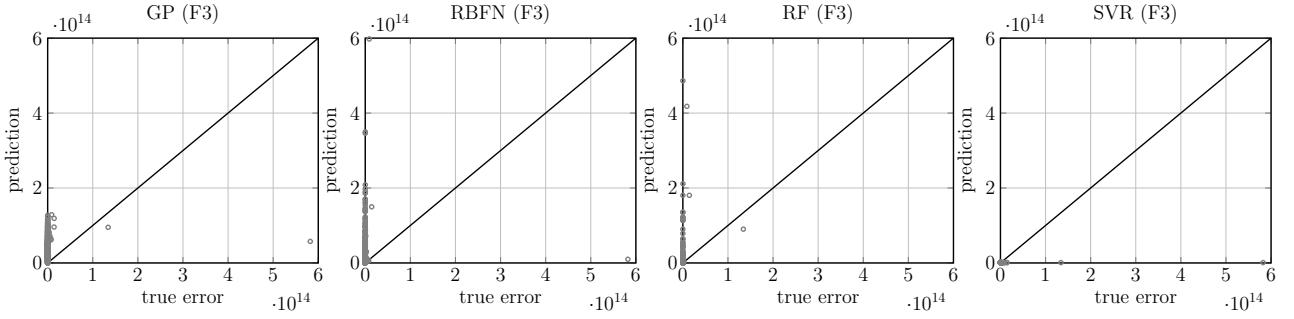


Figure 3: Visual comparison of models for performance predictions on previously unseen parameter configurations (F3 with  $d = 10$ ).

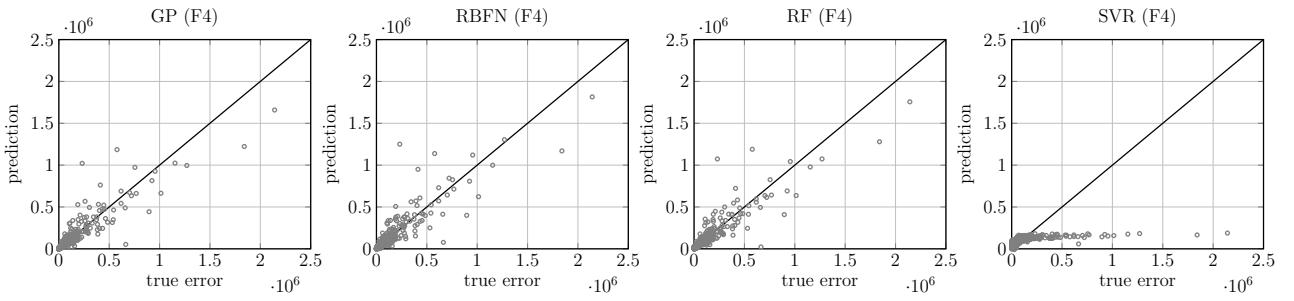


Figure 4: Visual comparison of models for performance predictions on previously unseen parameter configurations (F4 with  $d = 10$ ).

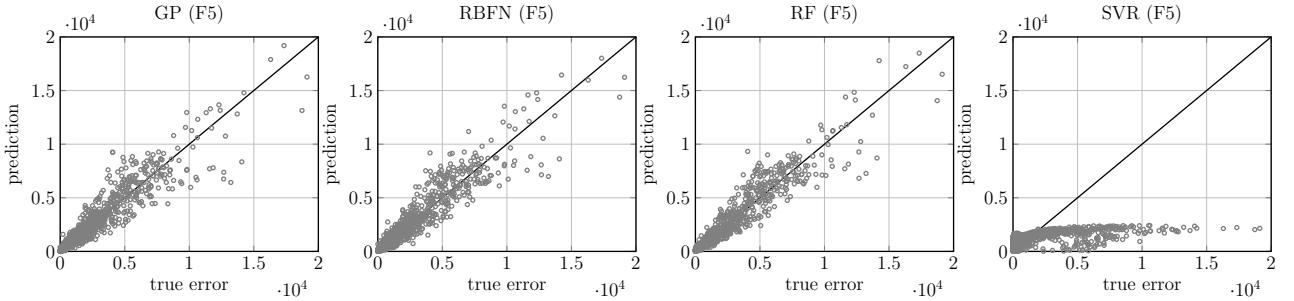


Figure 5: Visual comparison of models for performance predictions on previously unseen parameter configurations (F5 with  $d = 10$ ).

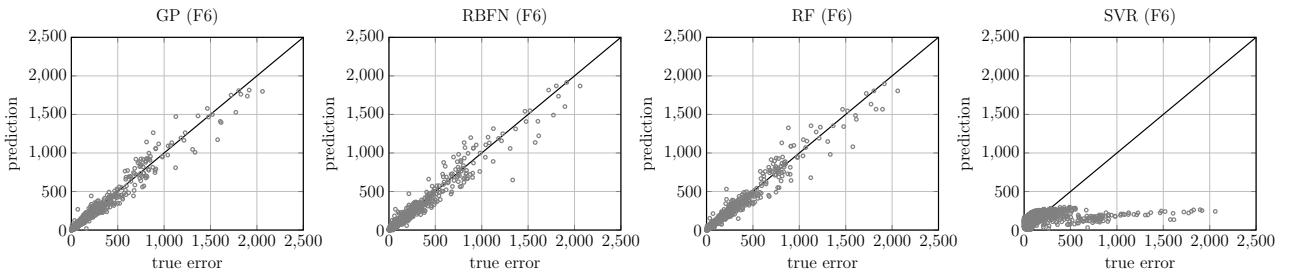


Figure 6: Visual comparison of models for performance predictions on previously unseen parameter configurations (F6 with  $d = 10$ ).

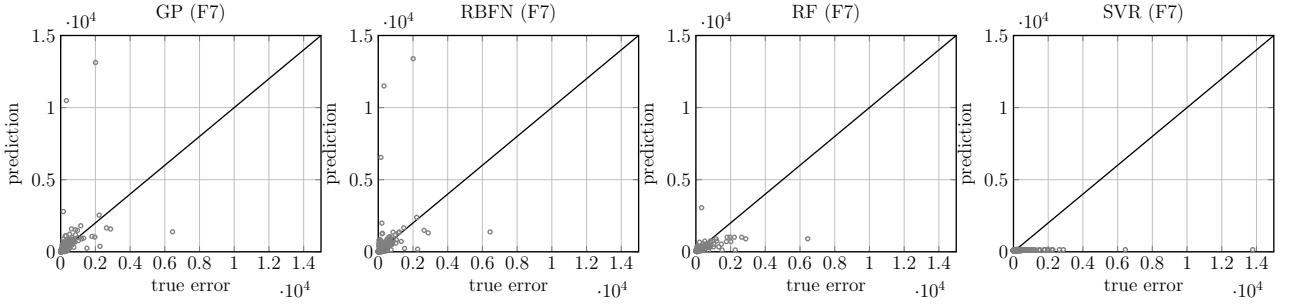


Figure 7: Visual comparison of models for performance predictions on previously unseen parameter configurations (F7 with  $d = 10$ ).

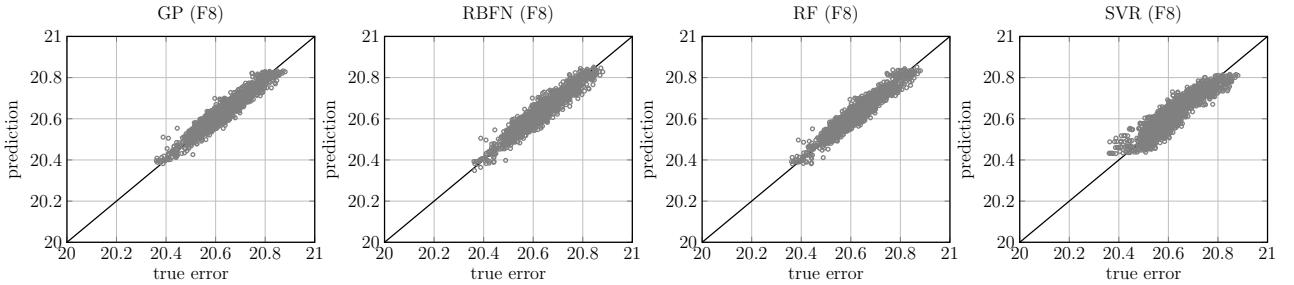


Figure 8: Visual comparison of models for performance predictions on previously unseen parameter configurations (F8 with  $d = 10$ ).

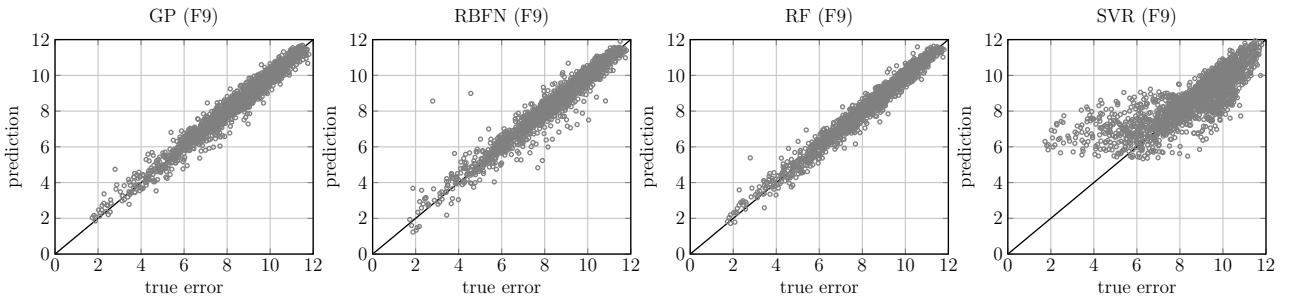


Figure 9: Visual comparison of models for performance predictions on previously unseen parameter configurations (F9 with  $d = 10$ ).

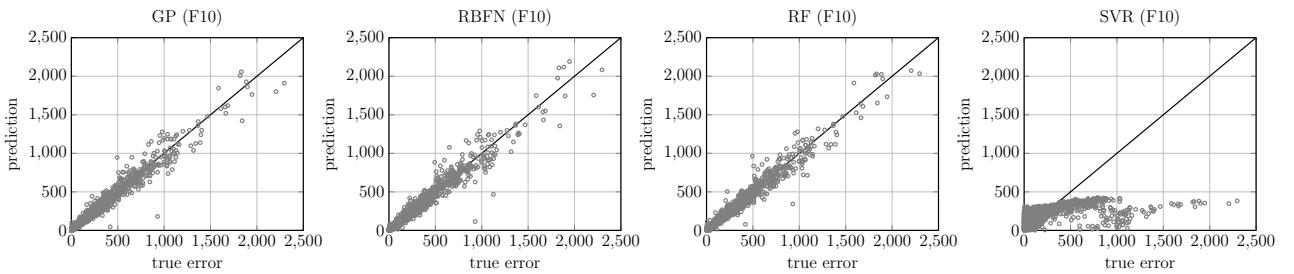


Figure 10: Visual comparison of models for performance predictions on previously unseen parameter configurations (F10 with  $d = 10$ ).

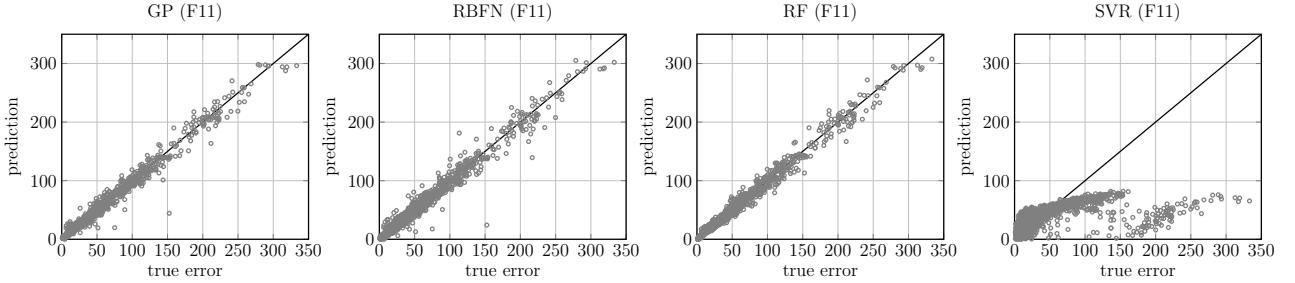


Figure 11: Visual comparison of models for performance predictions on previously unseen parameter configurations (F11 with  $d = 10$ ).

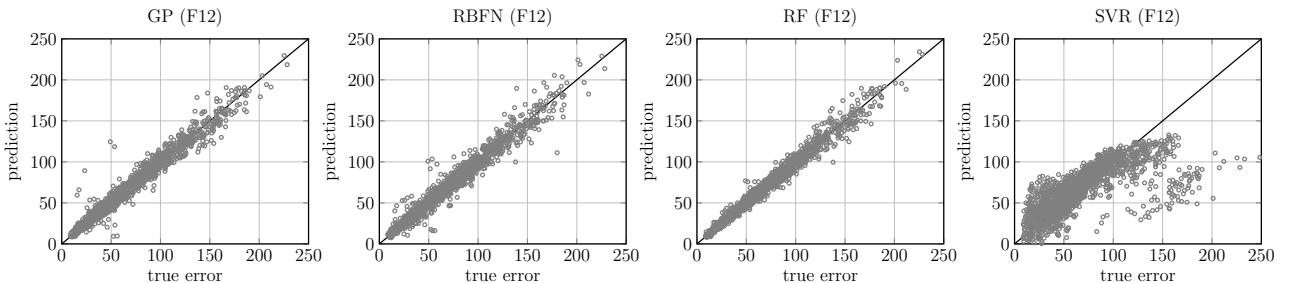


Figure 12: Visual comparison of models for performance predictions on previously unseen parameter configurations (F12 with  $d = 10$ ).

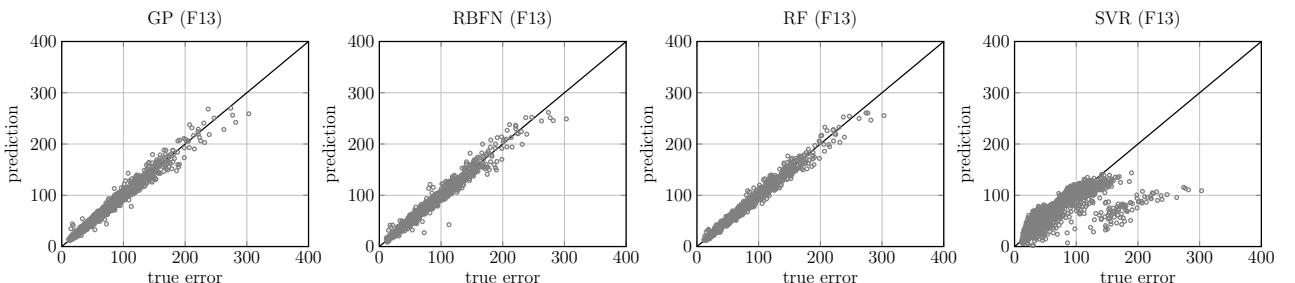


Figure 13: Visual comparison of models for performance predictions on previously unseen parameter configurations (F13 with  $d = 10$ ).

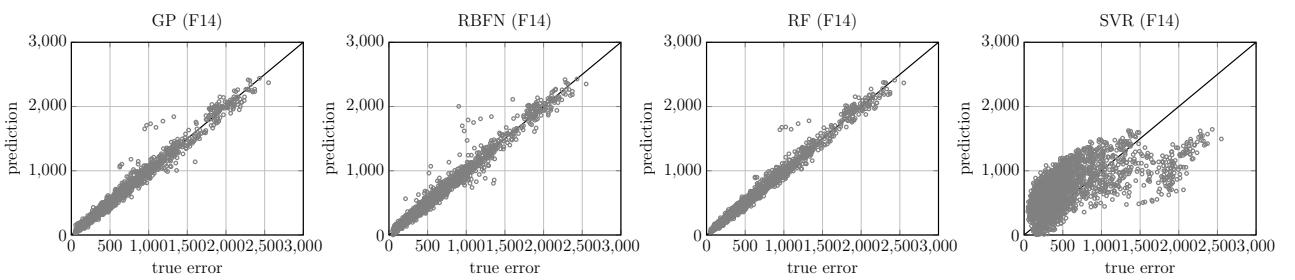


Figure 14: Visual comparison of models for performance predictions on previously unseen parameter configurations (F14 with  $d = 10$ ).

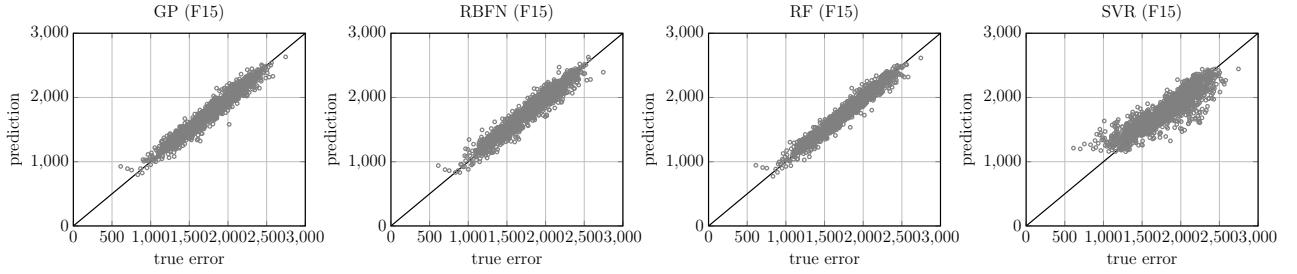


Figure 15: Visual comparison of models for performance predictions on previously unseen parameter configurations (F15 with  $d = 10$ ).

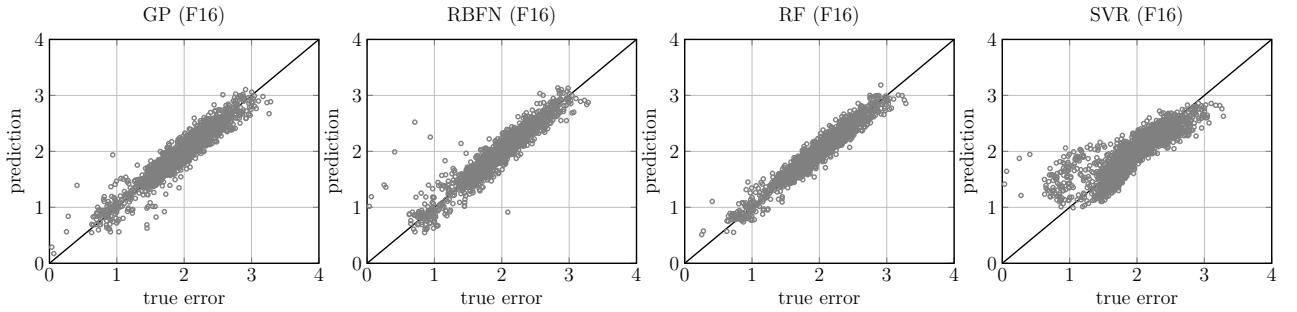


Figure 16: Visual comparison of models for performance predictions on previously unseen parameter configurations (F16 with  $d = 10$ ).

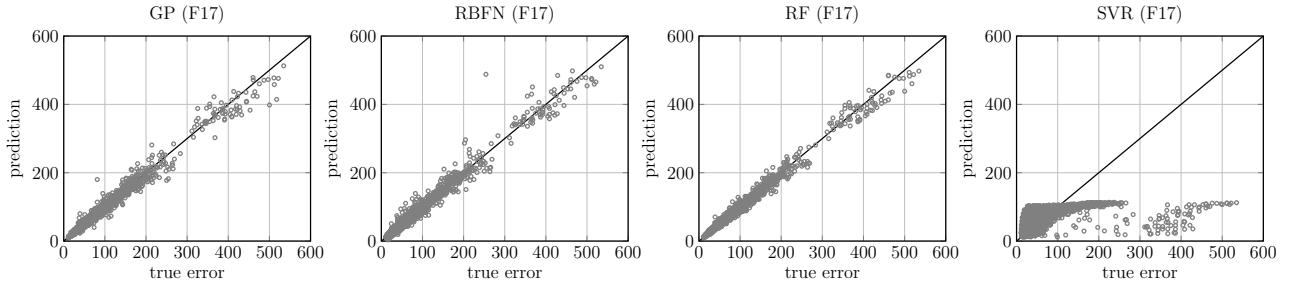


Figure 17: Visual comparison of models for performance predictions on previously unseen parameter configurations (F17 with  $d = 10$ ).

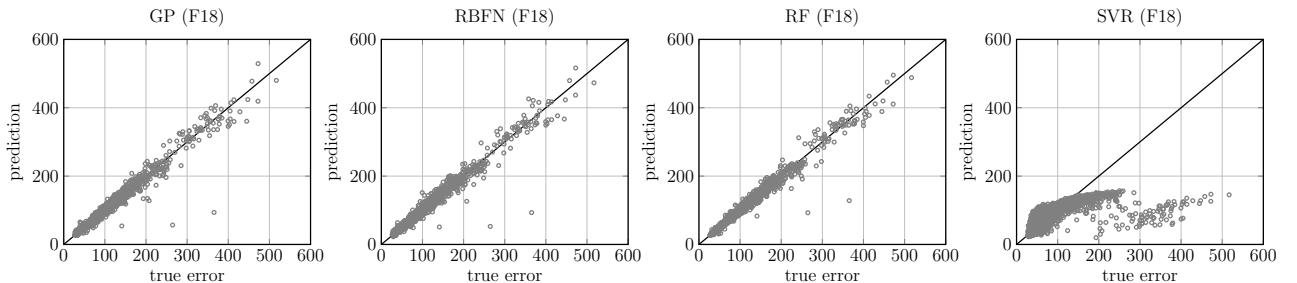


Figure 18: Visual comparison of models for performance predictions on previously unseen parameter configurations (F18 with  $d = 10$ ).

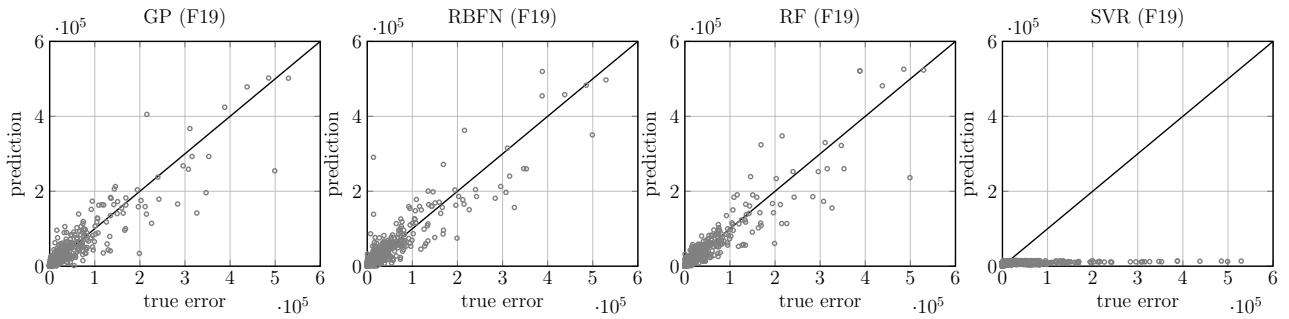


Figure 19: Visual comparison of models for performance predictions on previously unseen parameter configurations (F19 with  $d = 10$ ).

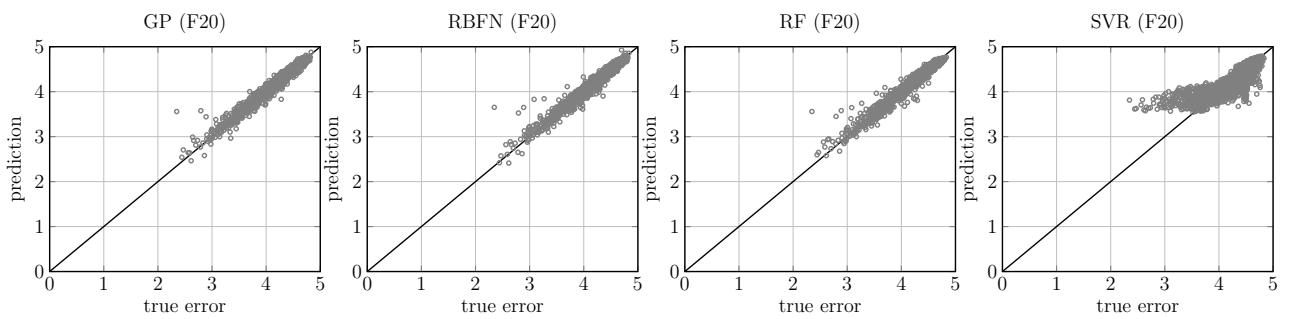


Figure 20: Visual comparison of models for performance predictions on previously unseen parameter configurations (F20 with  $d = 10$ ).

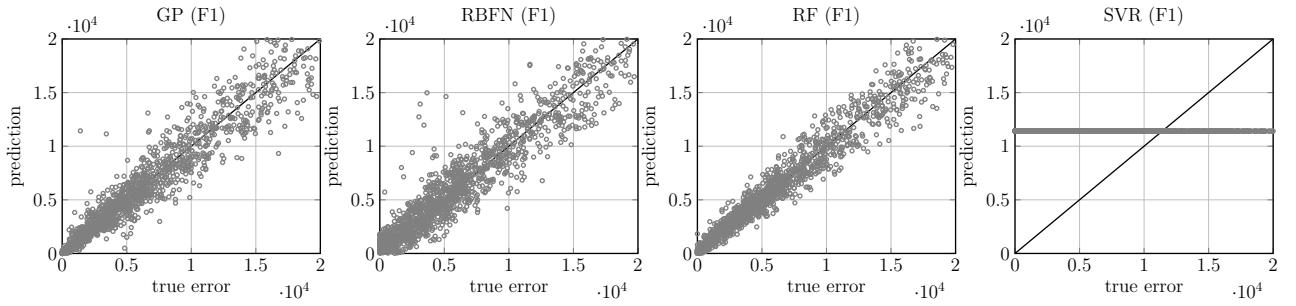


Figure 21: Visual comparison of models for performance predictions on previously unseen parameter configurations (F1 with  $d = 30$ ).

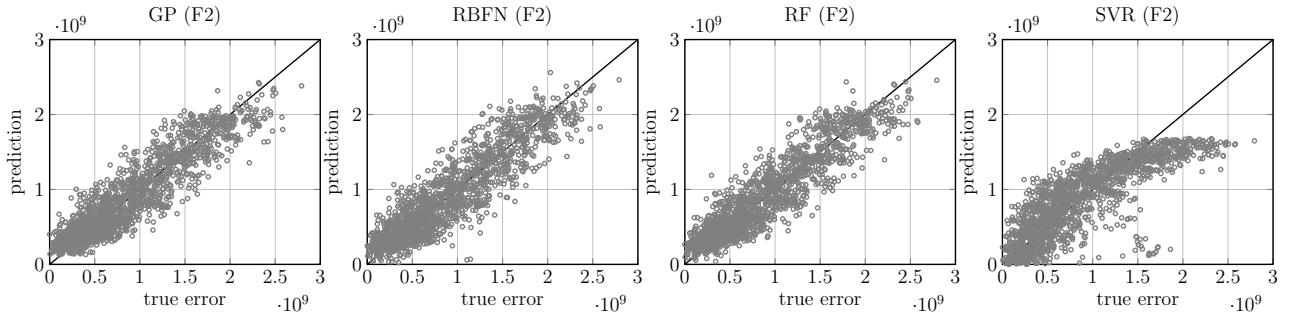


Figure 22: Visual comparison of models for performance predictions on previously unseen parameter configurations (F2 with  $d = 30$ ).

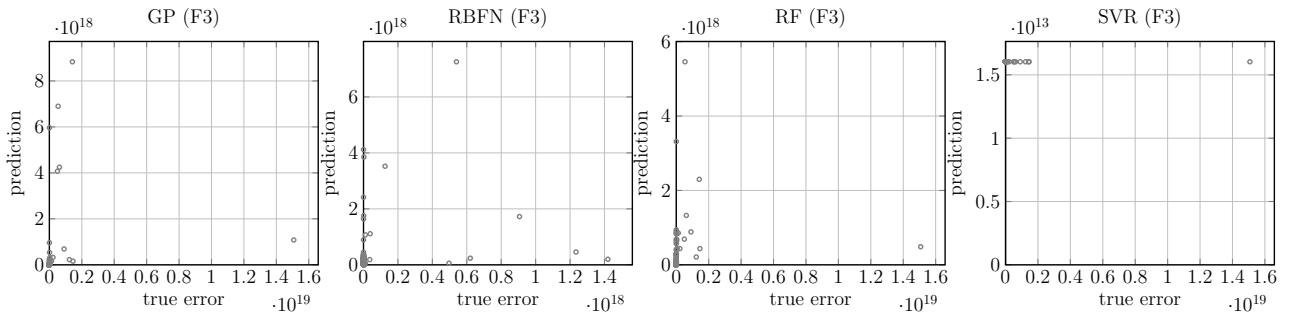


Figure 23: Visual comparison of models for performance predictions on previously unseen parameter configurations (F3 with  $d = 30$ ).

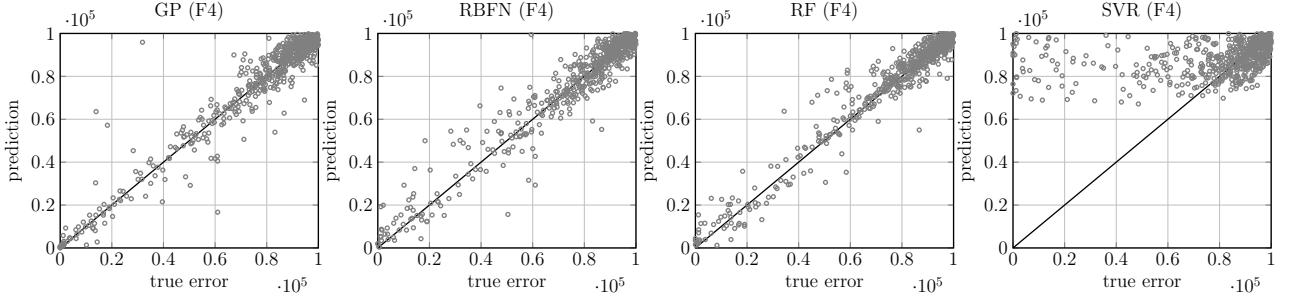


Figure 24: Visual comparison of models for performance predictions on previously unseen parameter configurations (F4 with  $d = 30$ ).

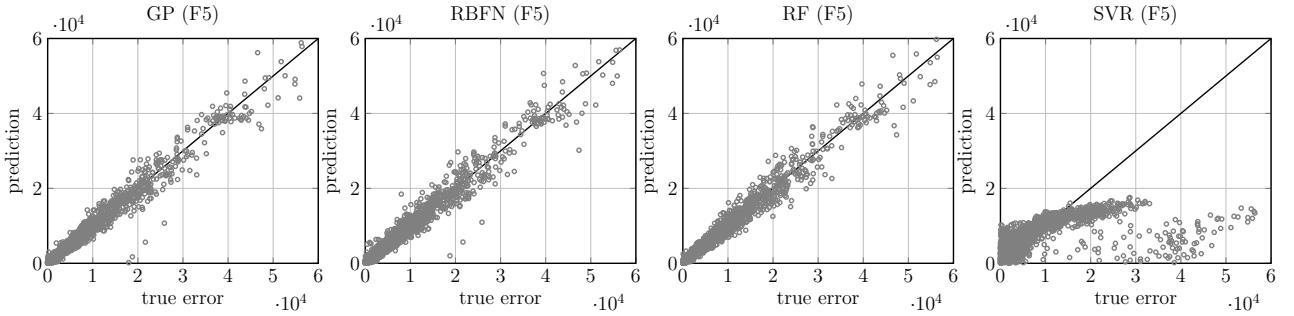


Figure 25: Visual comparison of models for performance predictions on previously unseen parameter configurations (F5 with  $d = 30$ ).

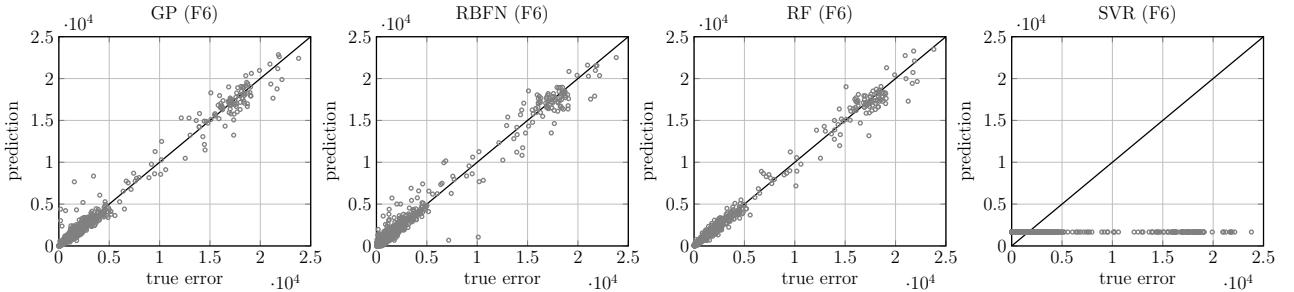


Figure 26: Visual comparison of models for performance predictions on previously unseen parameter configurations (F6 with  $d = 30$ ).

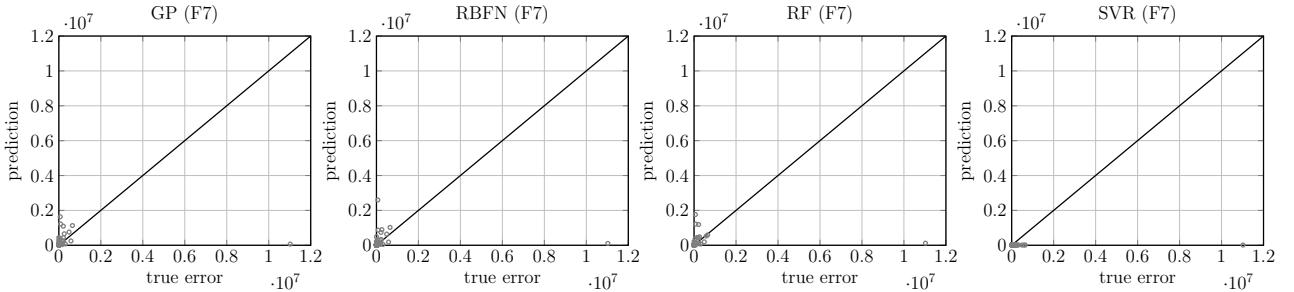


Figure 27: Visual comparison of models for performance predictions on previously unseen parameter configurations (F7 with  $d = 30$ ).

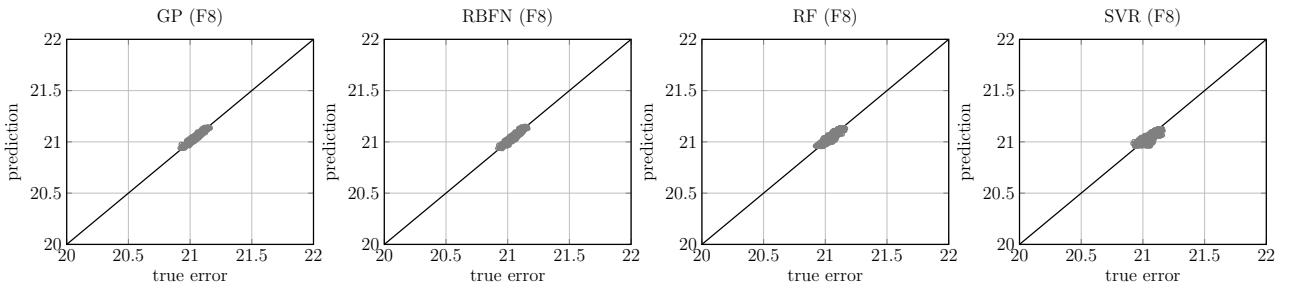


Figure 28: Visual comparison of models for performance predictions on previously unseen parameter configurations (F8 with  $d = 30$ ).

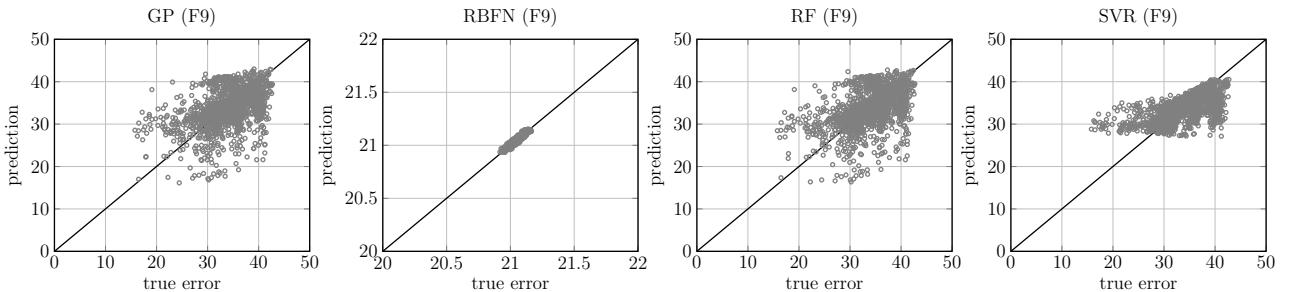


Figure 29: Visual comparison of models for performance predictions on previously unseen parameter configurations (F9 with  $d = 30$ ).

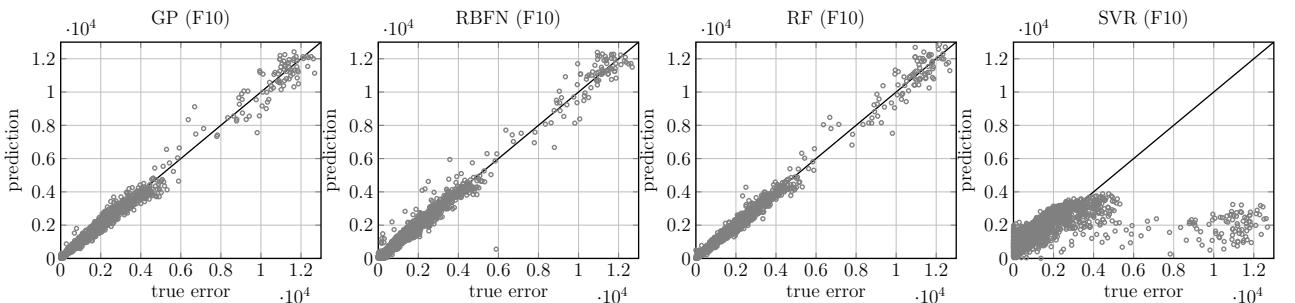


Figure 30: Visual comparison of models for performance predictions on previously unseen parameter configurations (F10 with  $d = 30$ ).

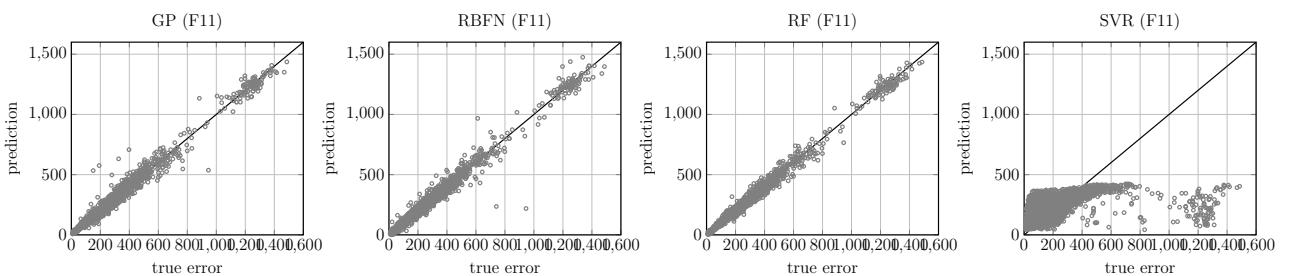


Figure 31: Visual comparison of models for performance predictions on previously unseen parameter configurations (F11 with  $d = 30$ ).

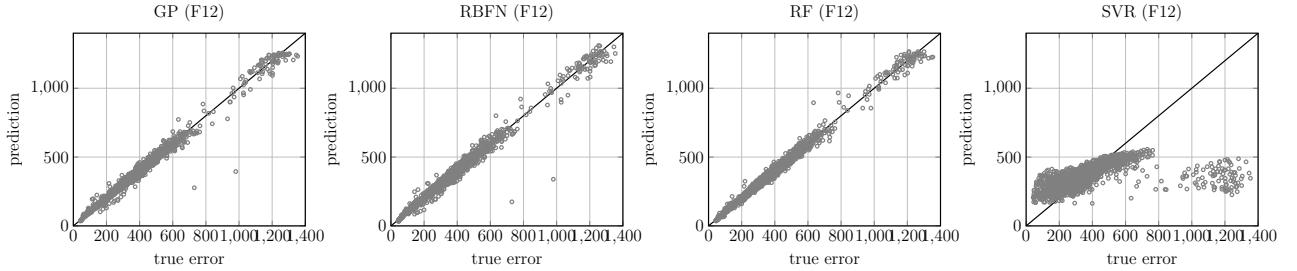


Figure 32: Visual comparison of models for performance predictions on previously unseen parameter configurations (F12 with  $d = 30$ ).

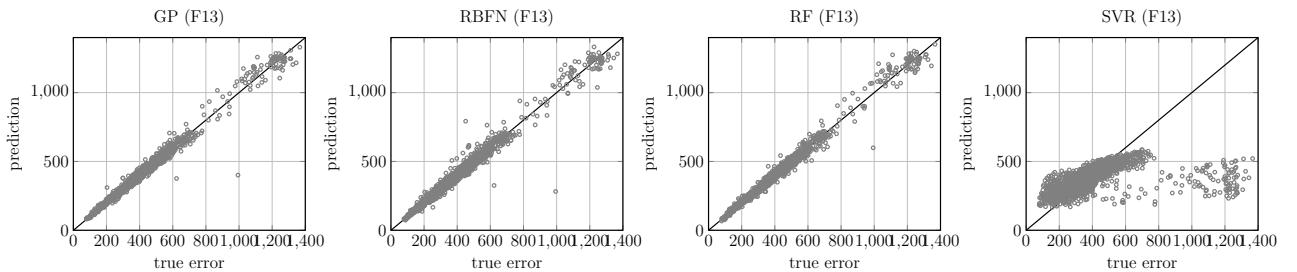


Figure 33: Visual comparison of models for performance predictions on previously unseen parameter configurations (F13 with  $d = 30$ ).

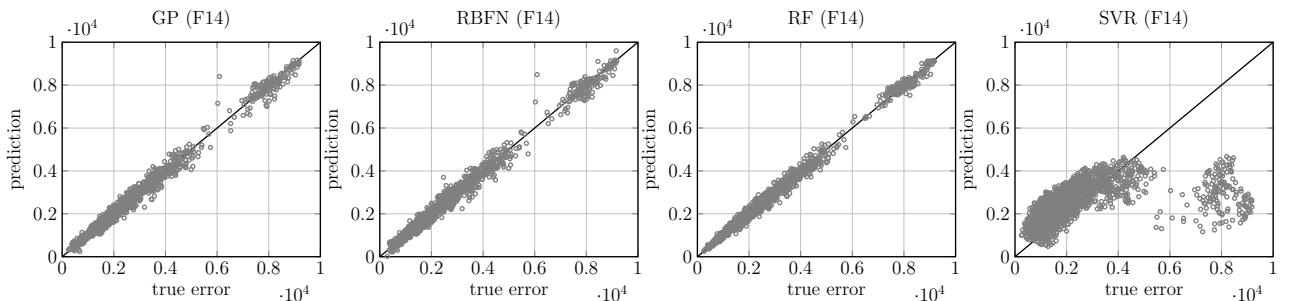


Figure 34: Visual comparison of models for performance predictions on previously unseen parameter configurations (F14 with  $d = 30$ ).

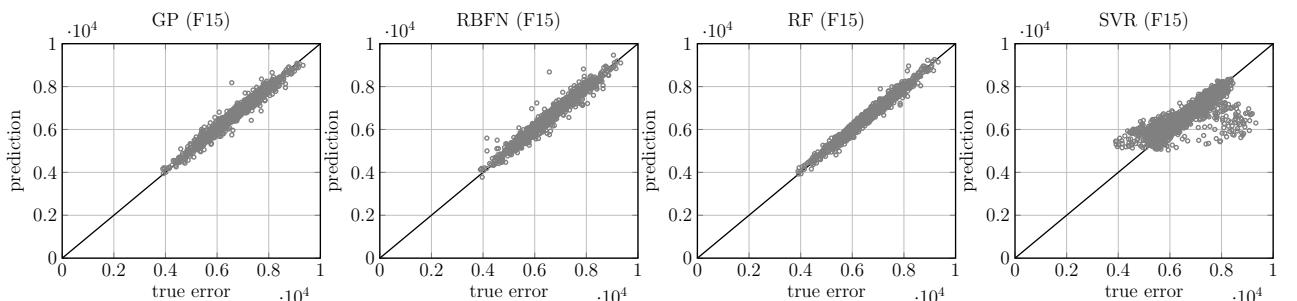


Figure 35: Visual comparison of models for performance predictions on previously unseen parameter configurations (F15 with  $d = 30$ ).

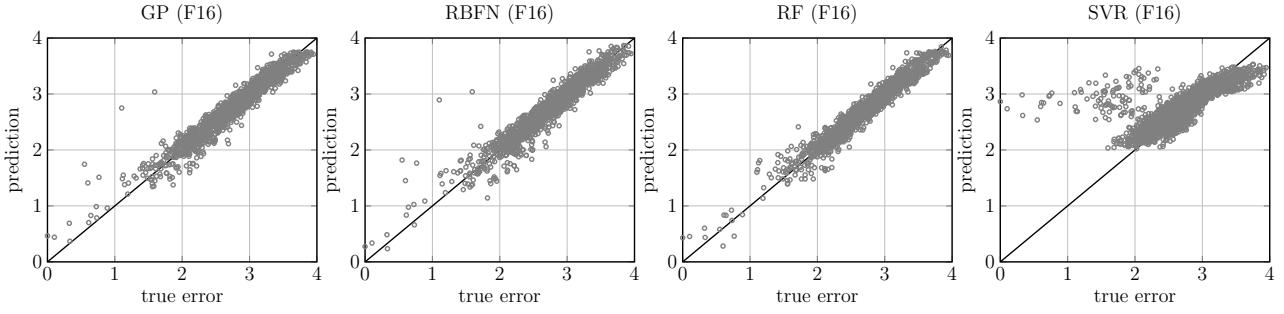


Figure 36: Visual comparison of models for performance predictions on previously unseen parameter configurations (F16 with  $d = 30$ ).

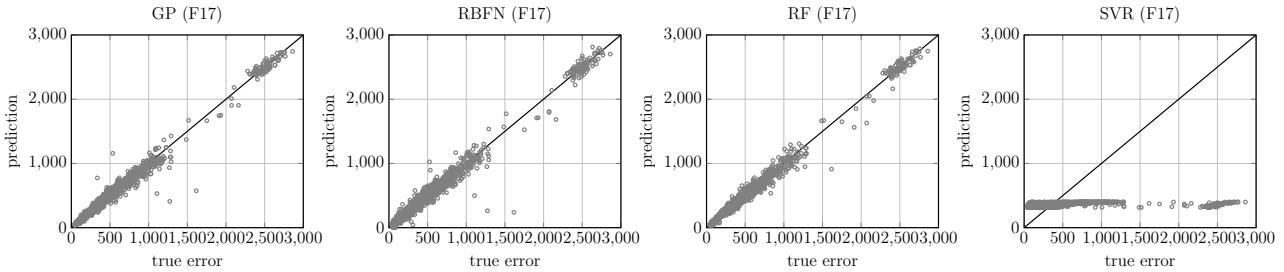


Figure 37: Visual comparison of models for performance predictions on previously unseen parameter configurations (F17 with  $d = 30$ ).

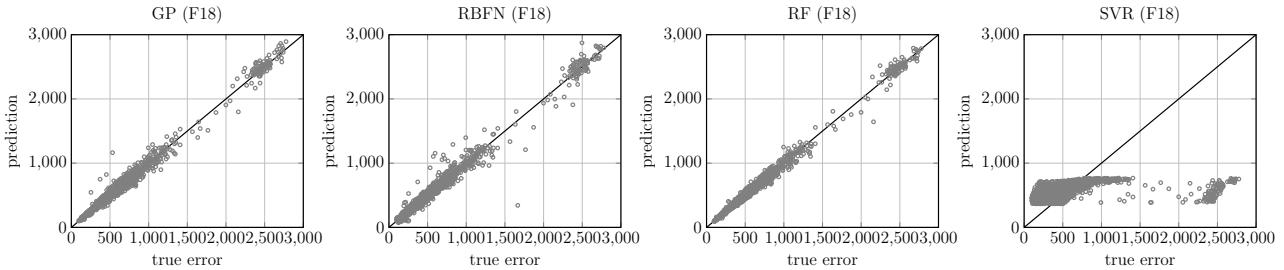


Figure 38: Visual comparison of models for performance predictions on previously unseen parameter configurations (F18 with  $d = 30$ ).

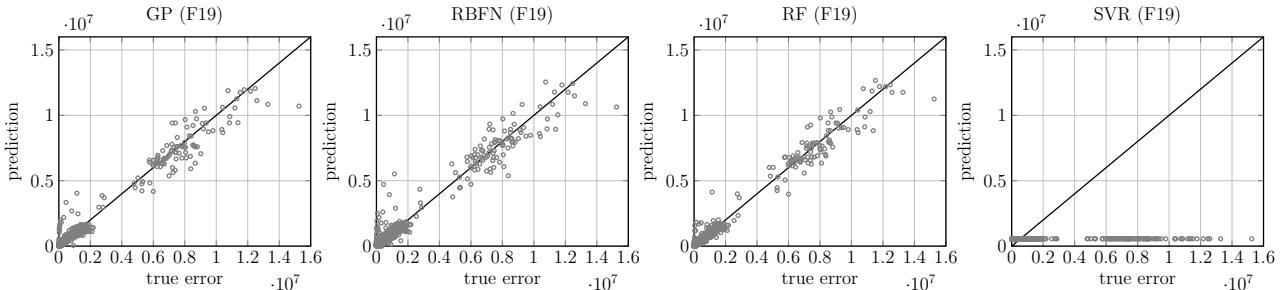


Figure 39: Visual comparison of models for performance predictions on previously unseen parameter configurations (F19 with  $d = 30$ ).

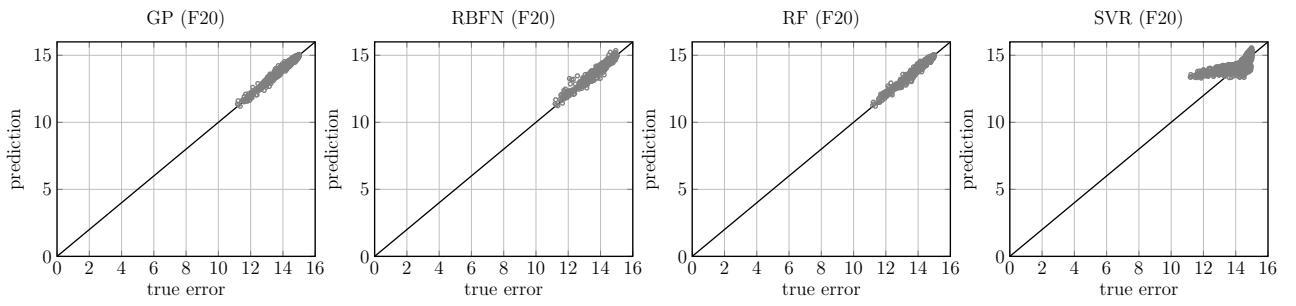


Figure 40: Visual comparison of models for performance predictions on previously unseen parameter configurations (F20 with  $d = 30$ ).

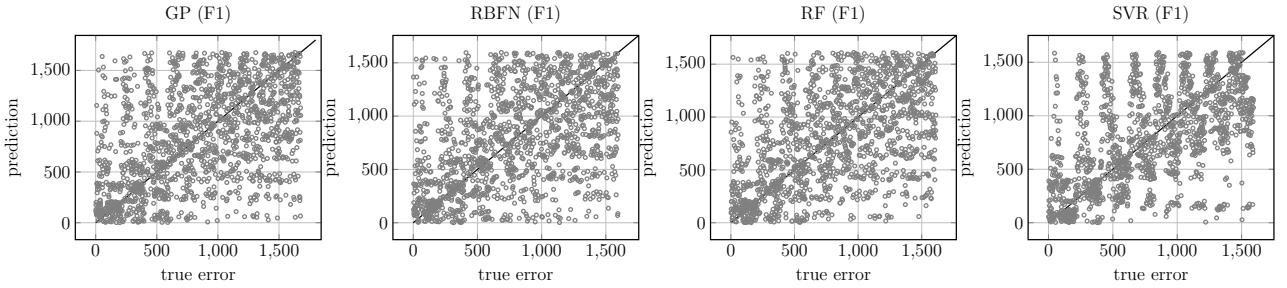


Figure 41: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F1 with  $d = 10$ ).

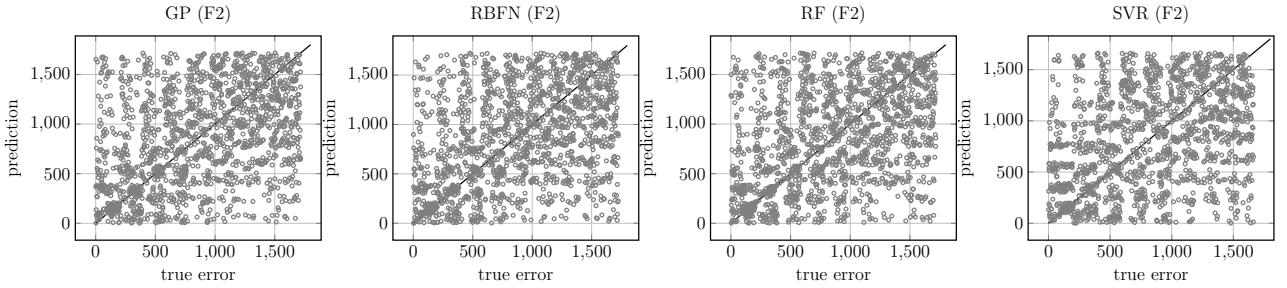


Figure 42: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F2 with  $d = 10$ ).

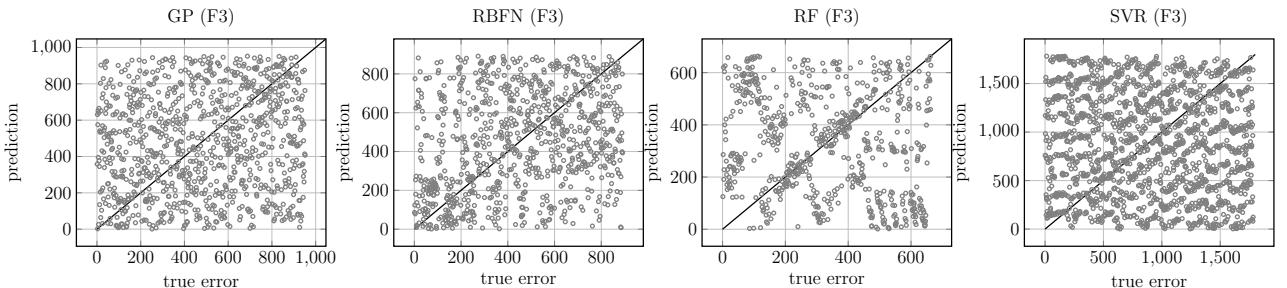


Figure 43: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F3 with  $d = 10$ ).

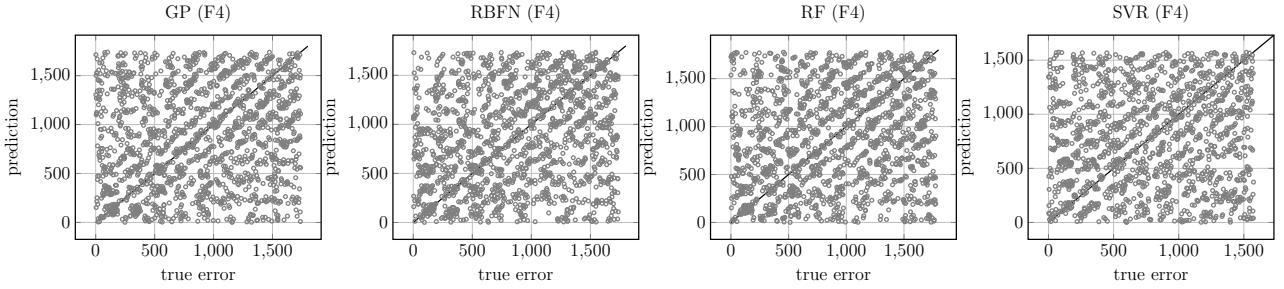


Figure 44: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F4 with  $d = 10$ ).

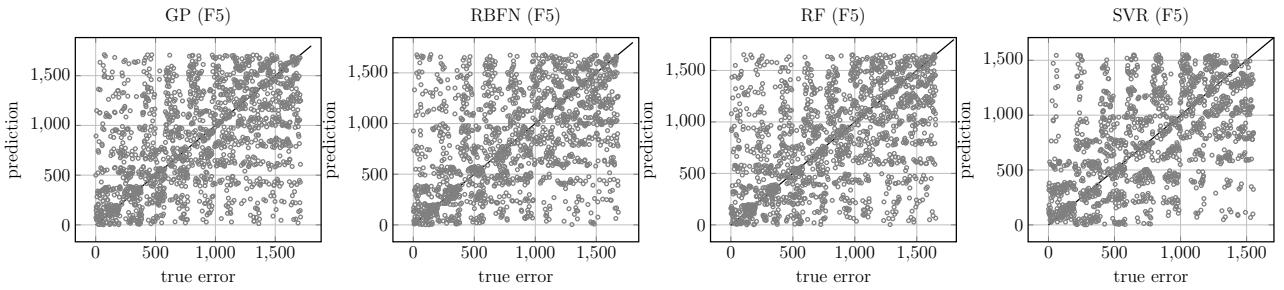


Figure 45: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F5 with  $d = 10$ ).

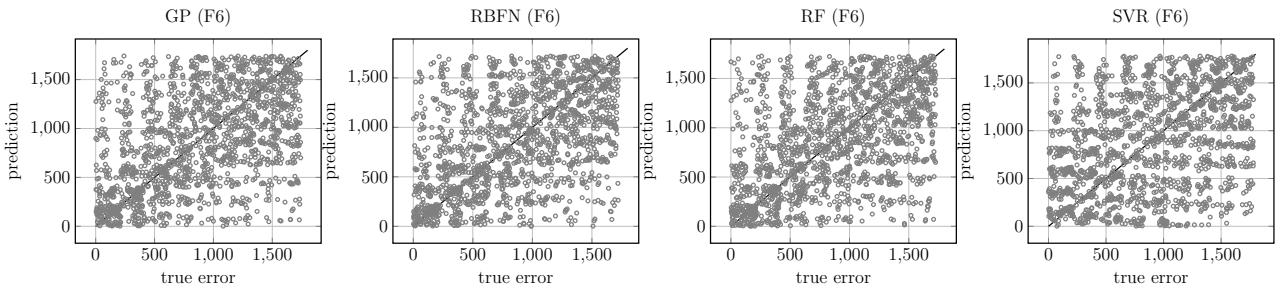


Figure 46: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F6 with  $d = 10$ ).

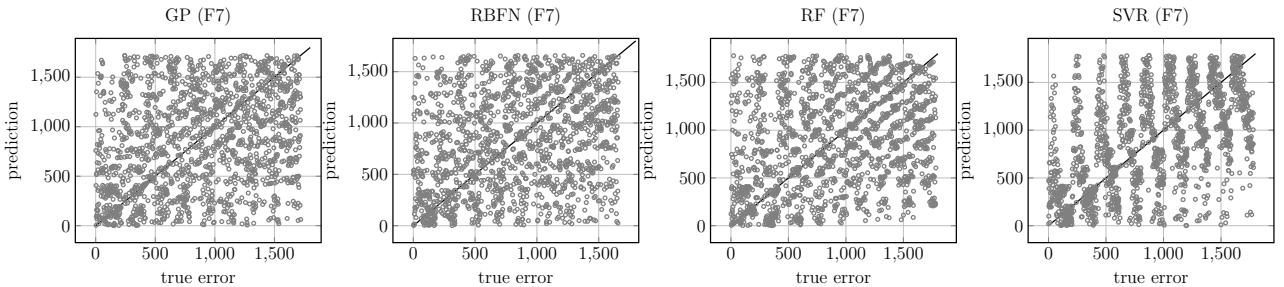


Figure 47: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F7 with  $d = 10$ ).

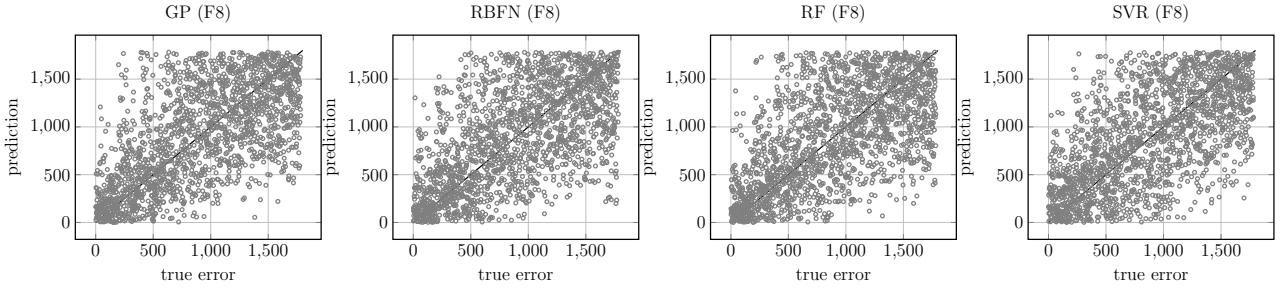


Figure 48: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F8 with  $d = 10$ ).

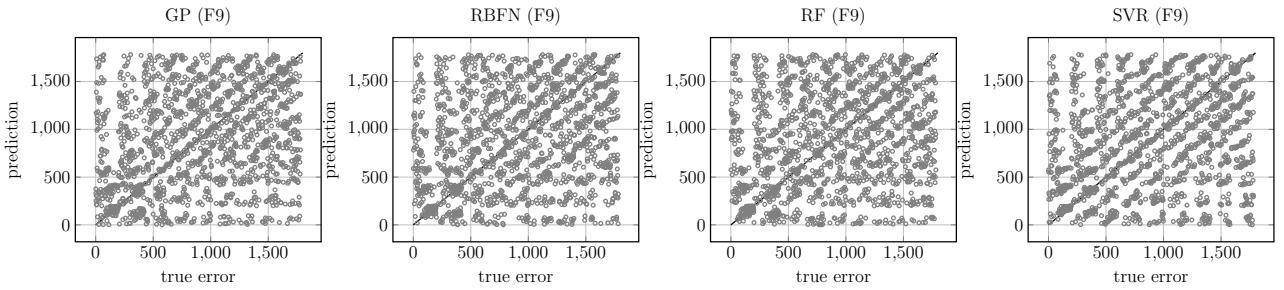


Figure 49: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F9 with  $d = 10$ ).

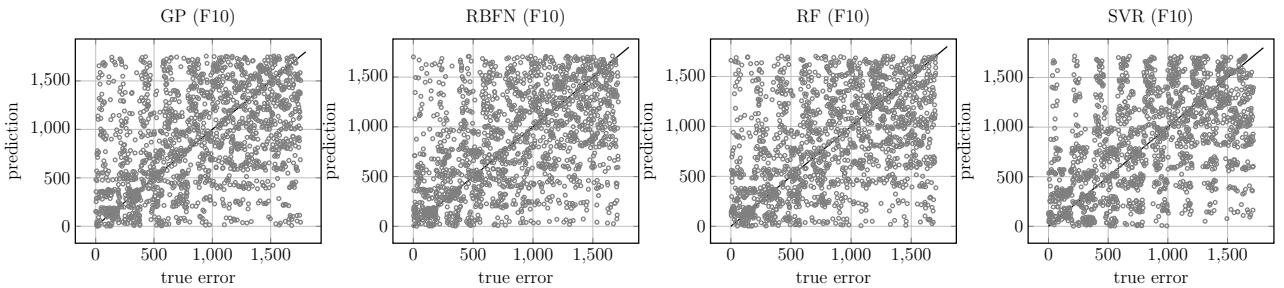


Figure 50: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F10 with  $d = 10$ ).

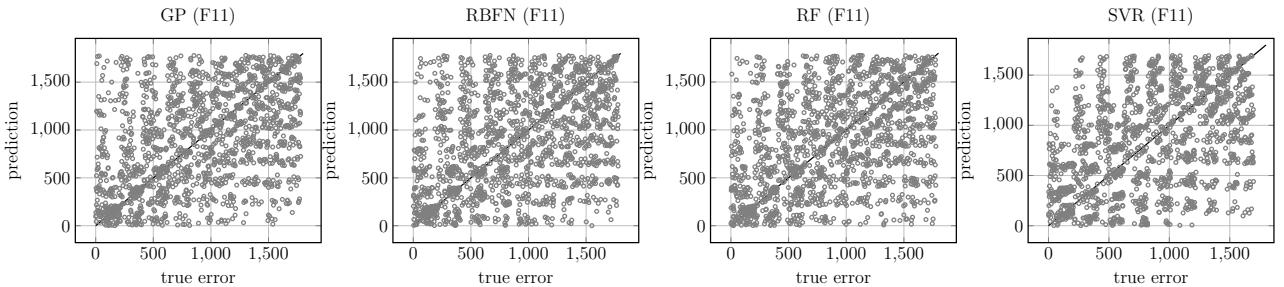


Figure 51: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F11 with  $d = 10$ ).

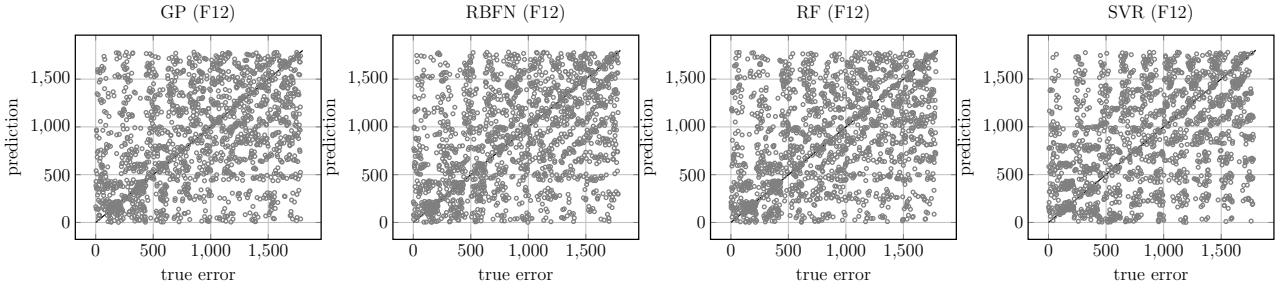


Figure 52: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F12 with  $d = 10$ ).

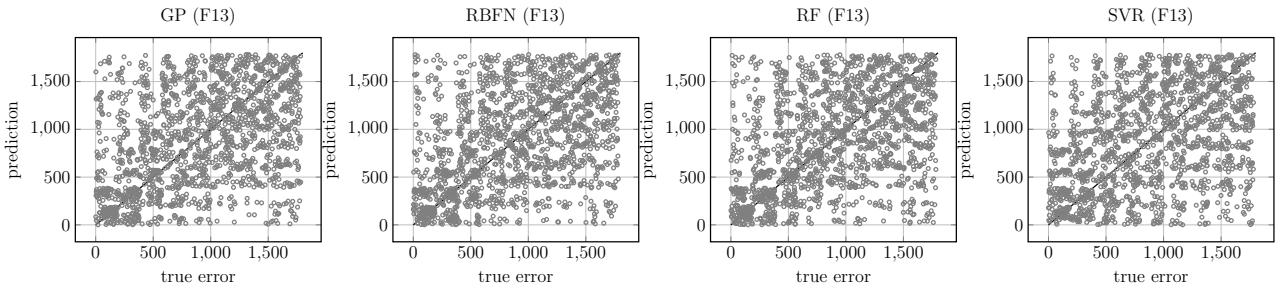


Figure 53: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F13 with  $d = 10$ ).

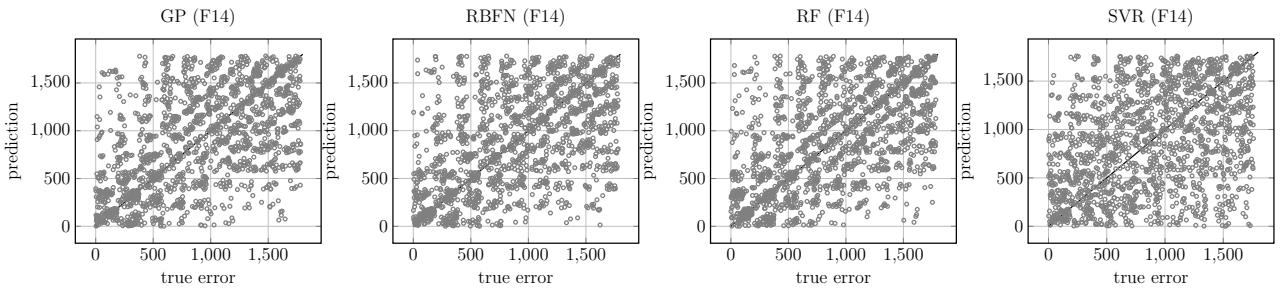


Figure 54: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F14 with  $d = 10$ ).

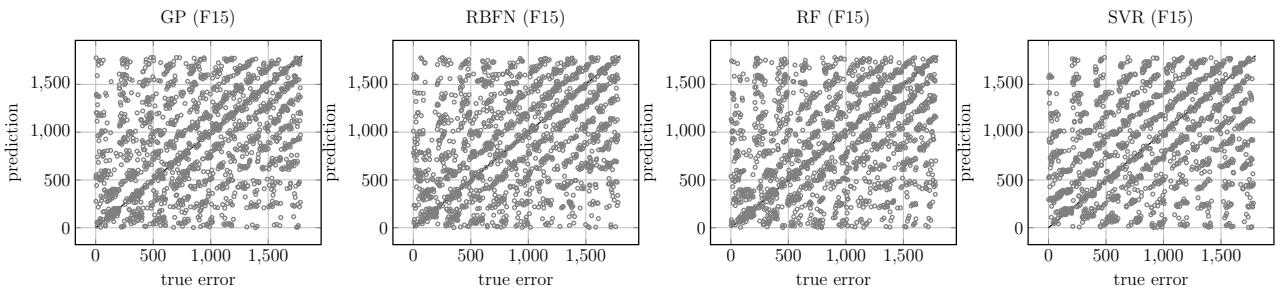


Figure 55: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F15 with  $d = 10$ ).

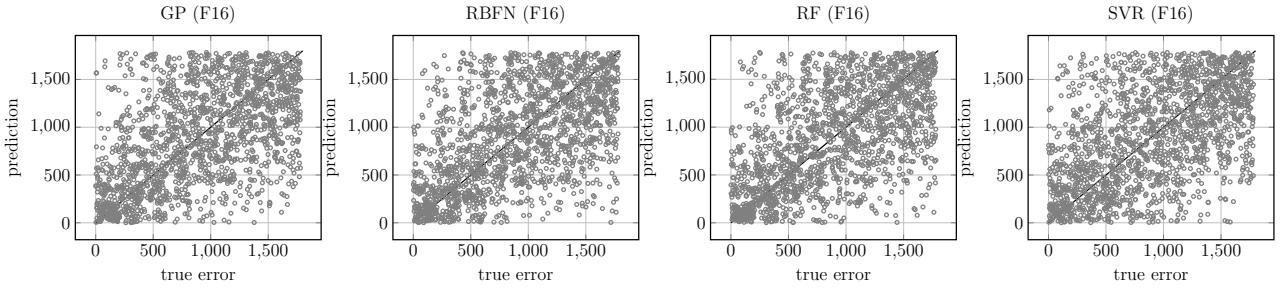


Figure 56: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F16 with  $d = 10$ ).

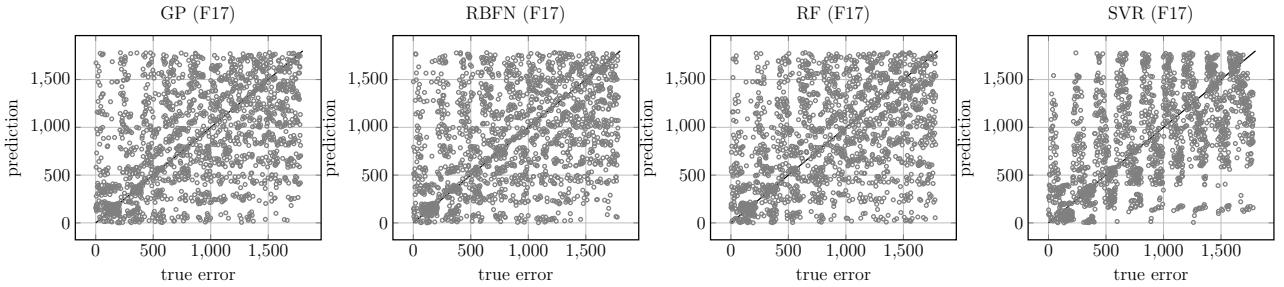


Figure 57: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F17 with  $d = 10$ ).

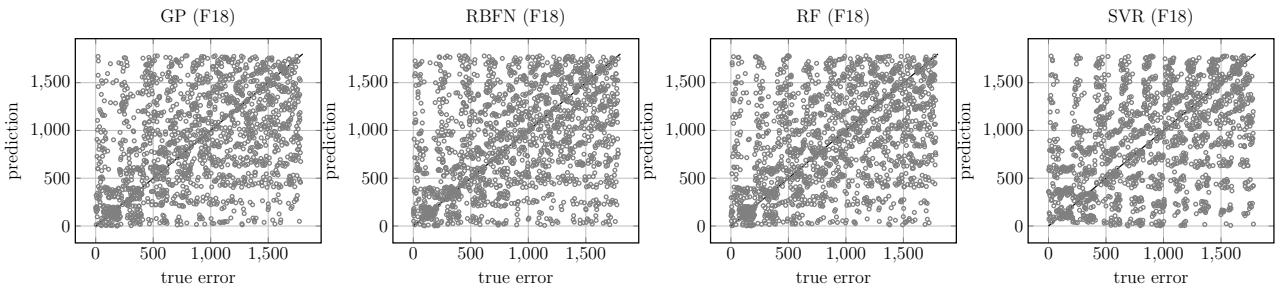


Figure 58: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F18 with  $d = 10$ ).

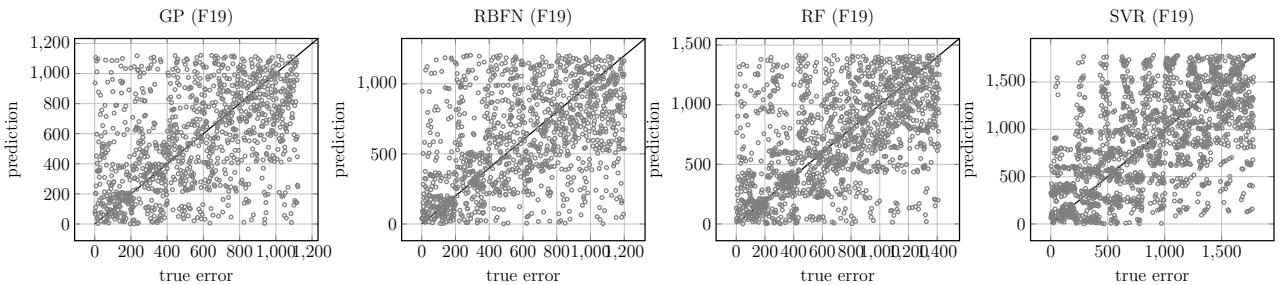


Figure 59: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F19 with  $d = 10$ ).

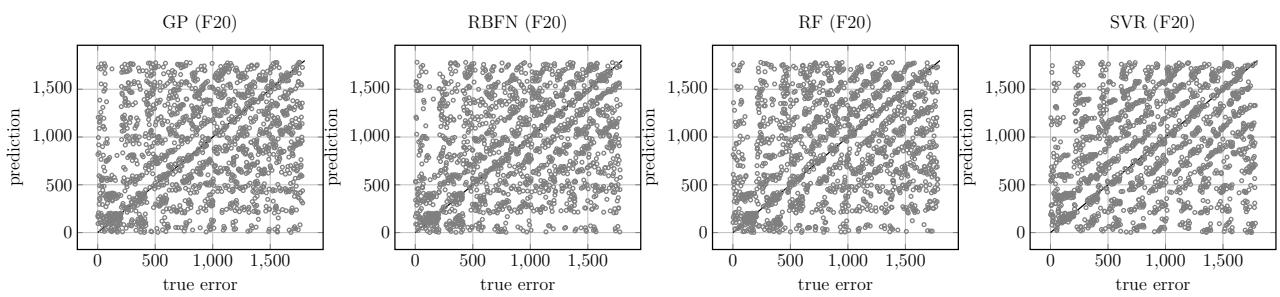


Figure 60: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F20 with  $d = 10$ ).

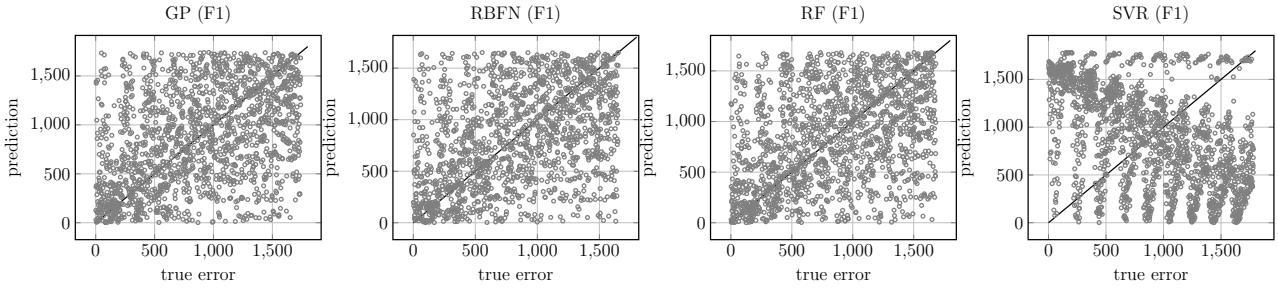


Figure 61: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F1 with  $d = 30$ ).

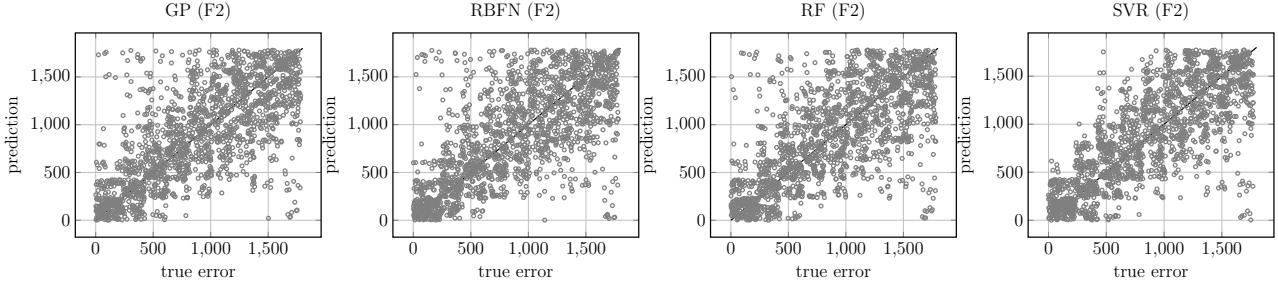


Figure 62: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F2 with  $d = 30$ ).

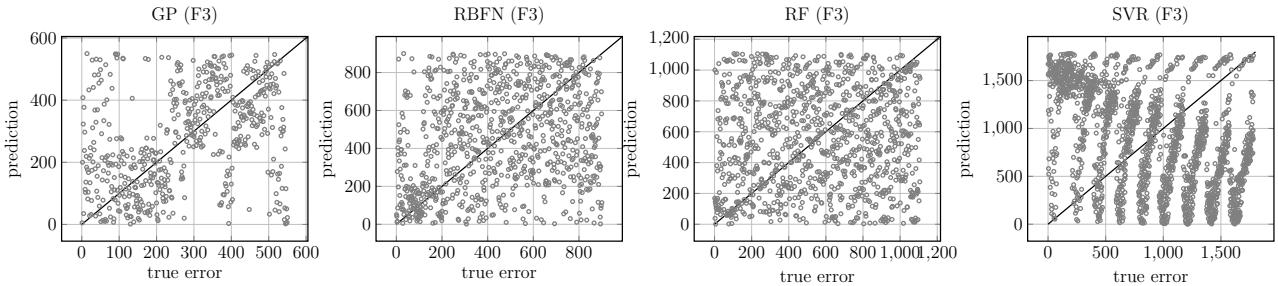


Figure 63: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F3 with  $d = 30$ ).

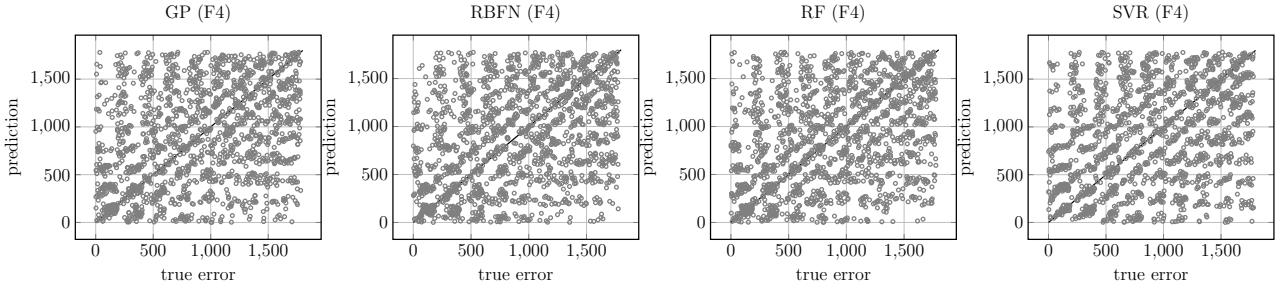


Figure 64: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F4 with  $d = 30$ ).

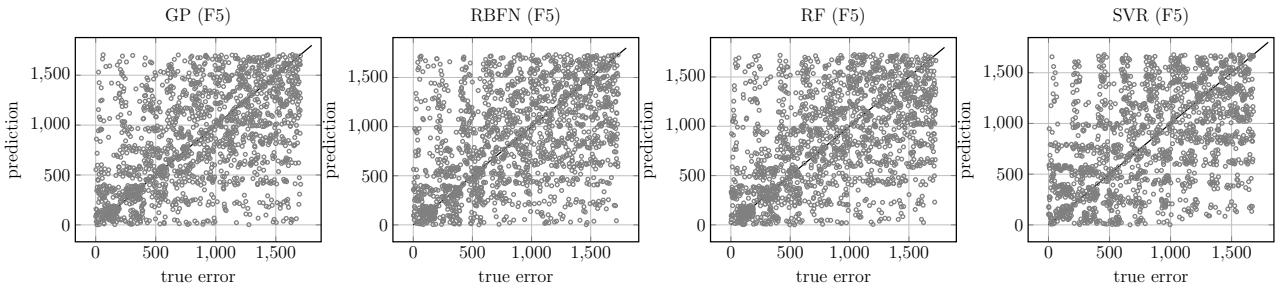


Figure 65: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F5 with  $d = 30$ ).

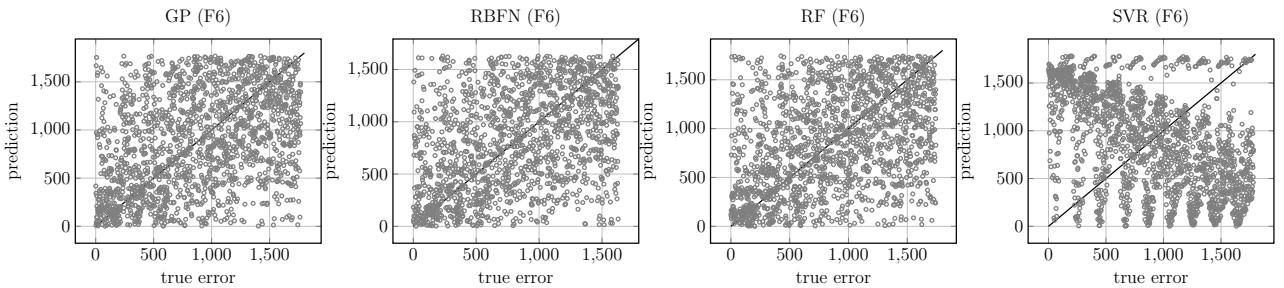


Figure 66: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F6 with  $d = 30$ ).

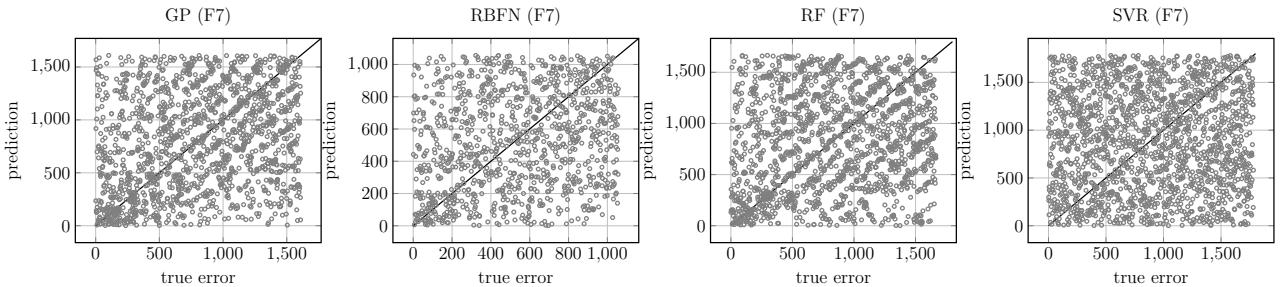


Figure 67: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F7 with  $d = 30$ ).

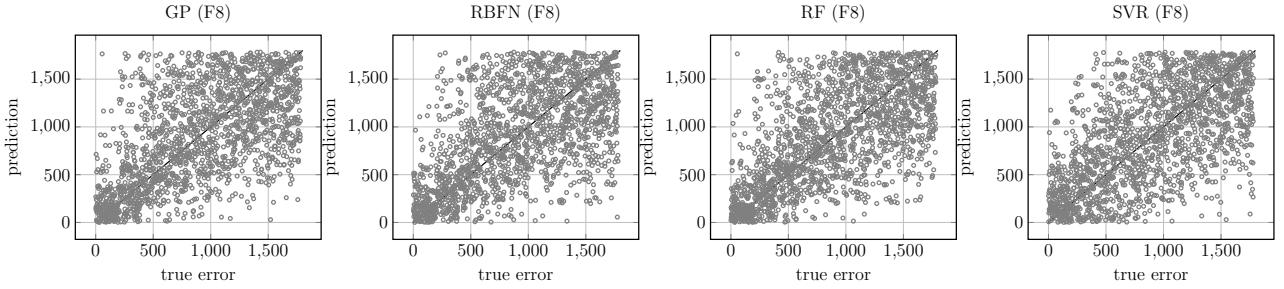


Figure 68: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F8 with  $d = 30$ ).

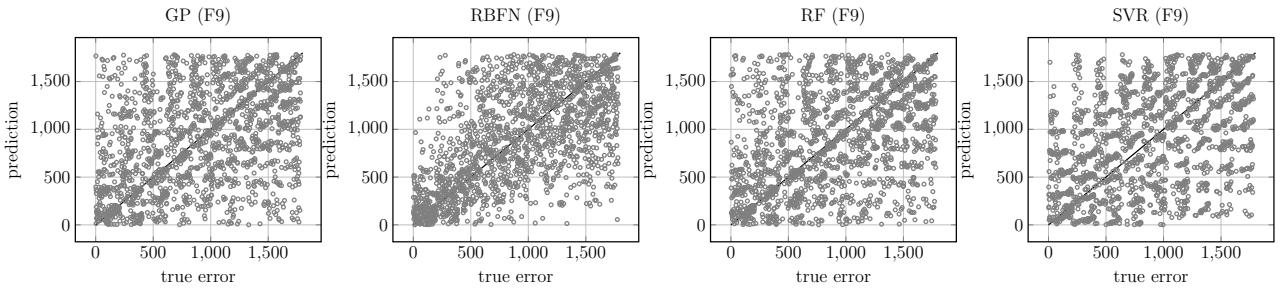


Figure 69: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F9 with  $d = 30$ ).

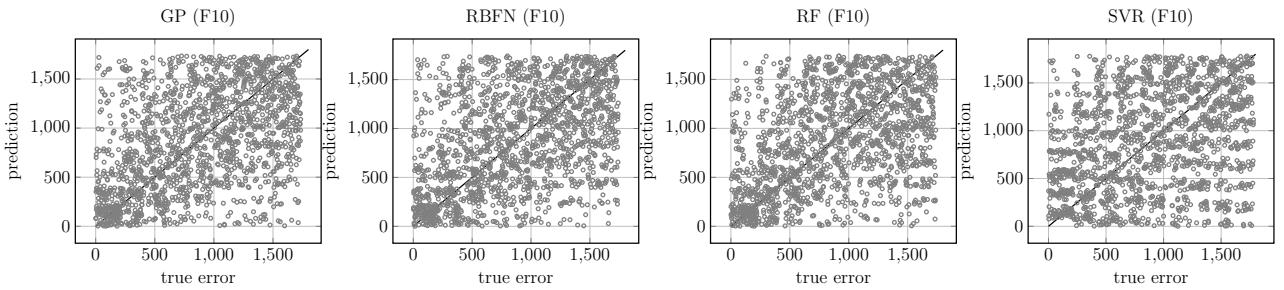


Figure 70: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F10 with  $d = 30$ ).

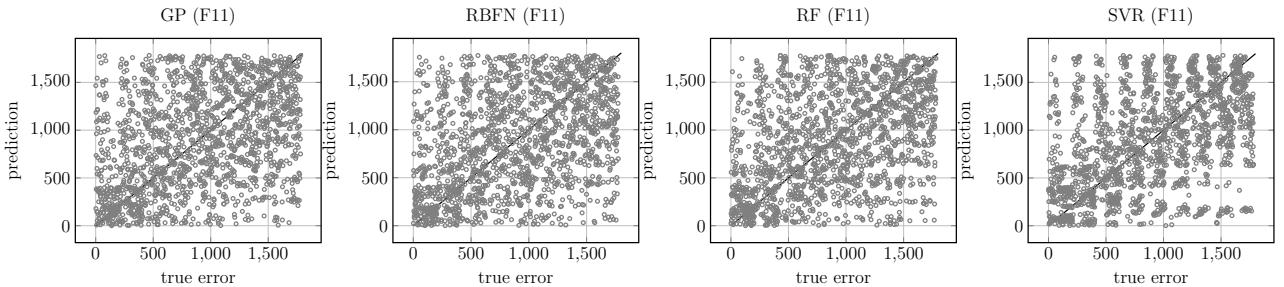


Figure 71: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F11 with  $d = 30$ ).

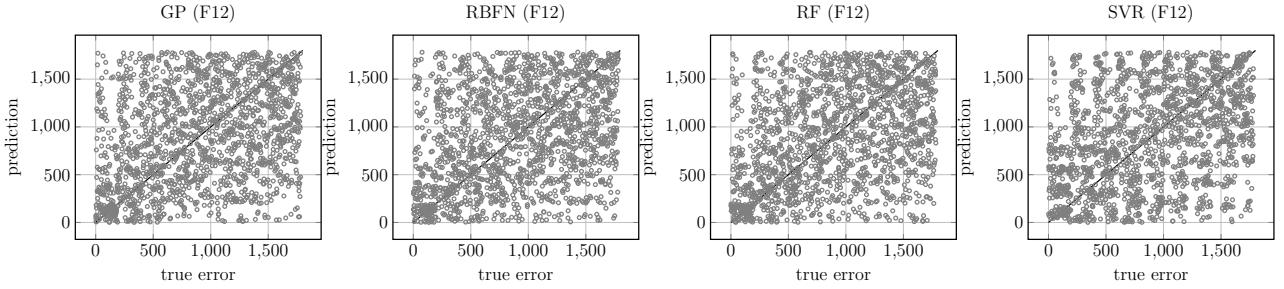


Figure 72: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F12 with  $d = 30$ ).

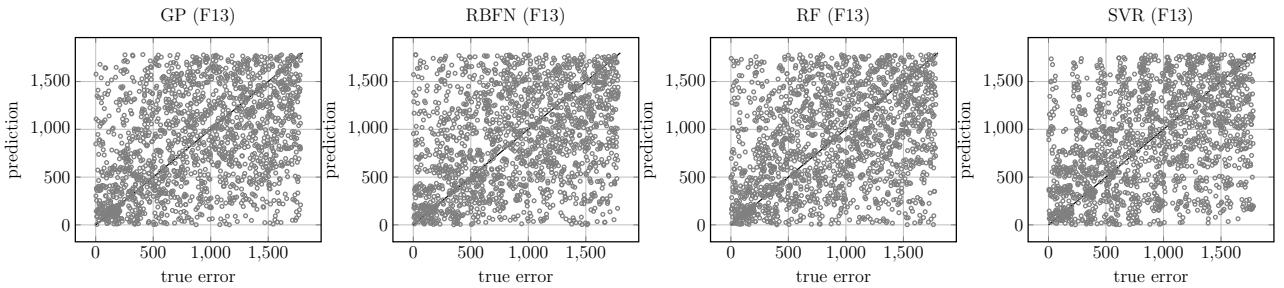


Figure 73: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F13 with  $d = 30$ ).

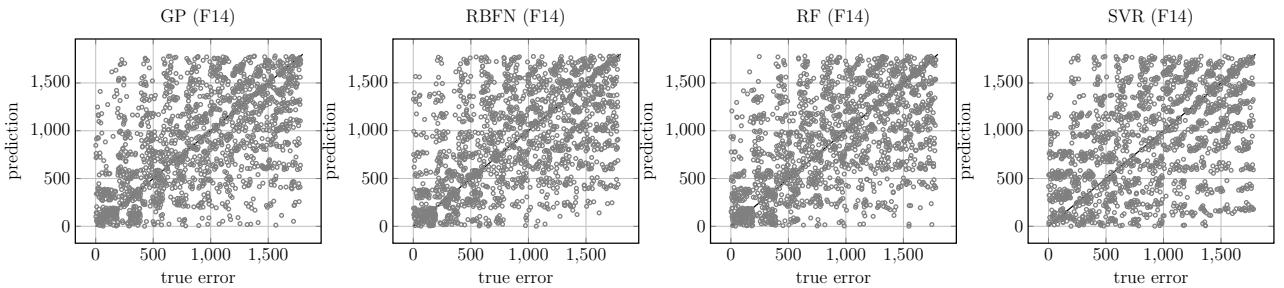


Figure 74: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F14 with  $d = 30$ ).

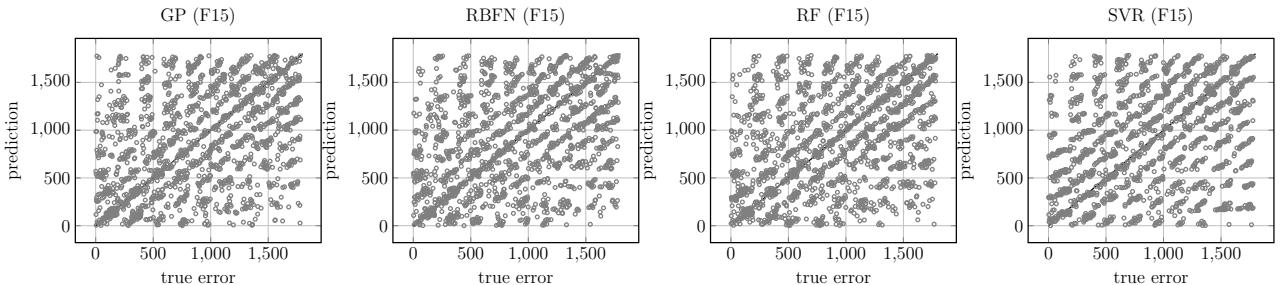


Figure 75: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F15 with  $d = 30$ ).

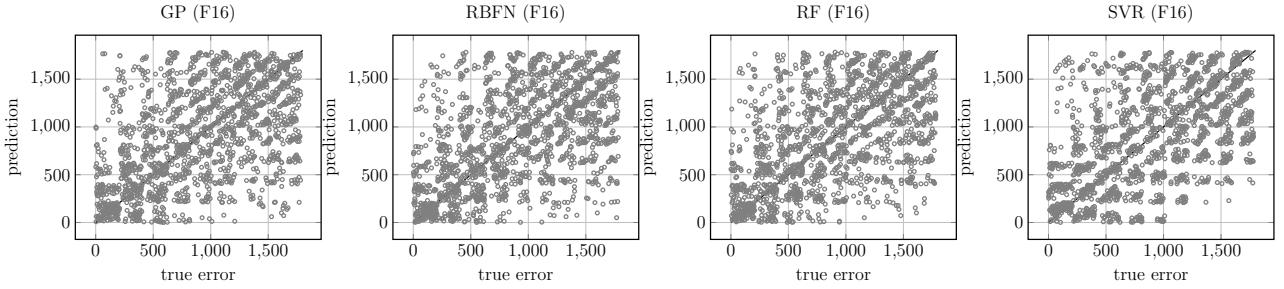


Figure 76: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F16 with  $d = 30$ ).

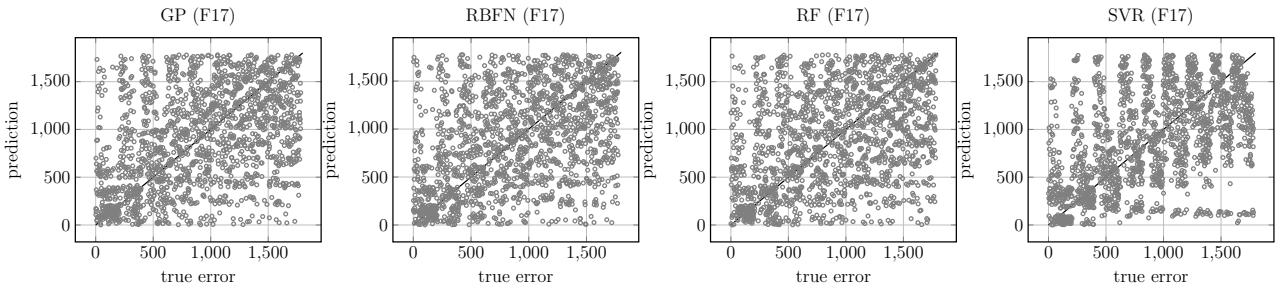


Figure 77: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F17 with  $d = 30$ ).

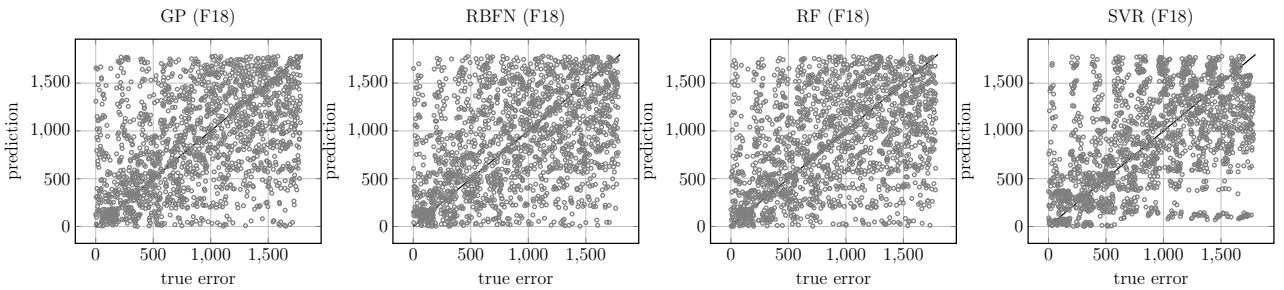


Figure 78: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F18 with  $d = 30$ ).

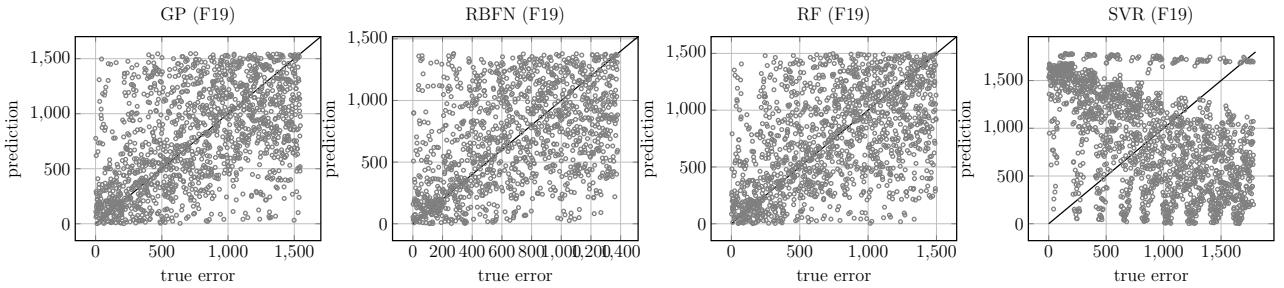


Figure 79: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F19 with  $d = 30$ ).

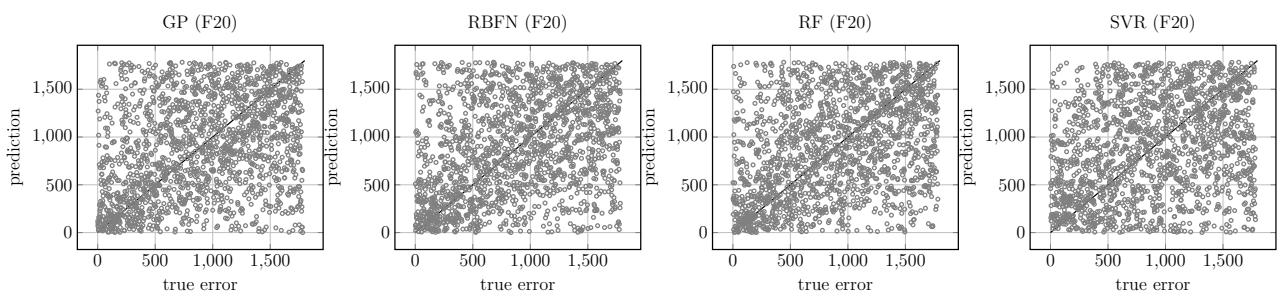


Figure 80: Visual comparison of ranks obtained by models for performance predictions on previously unseen parameter configurations (F20 with  $d = 30$ ).

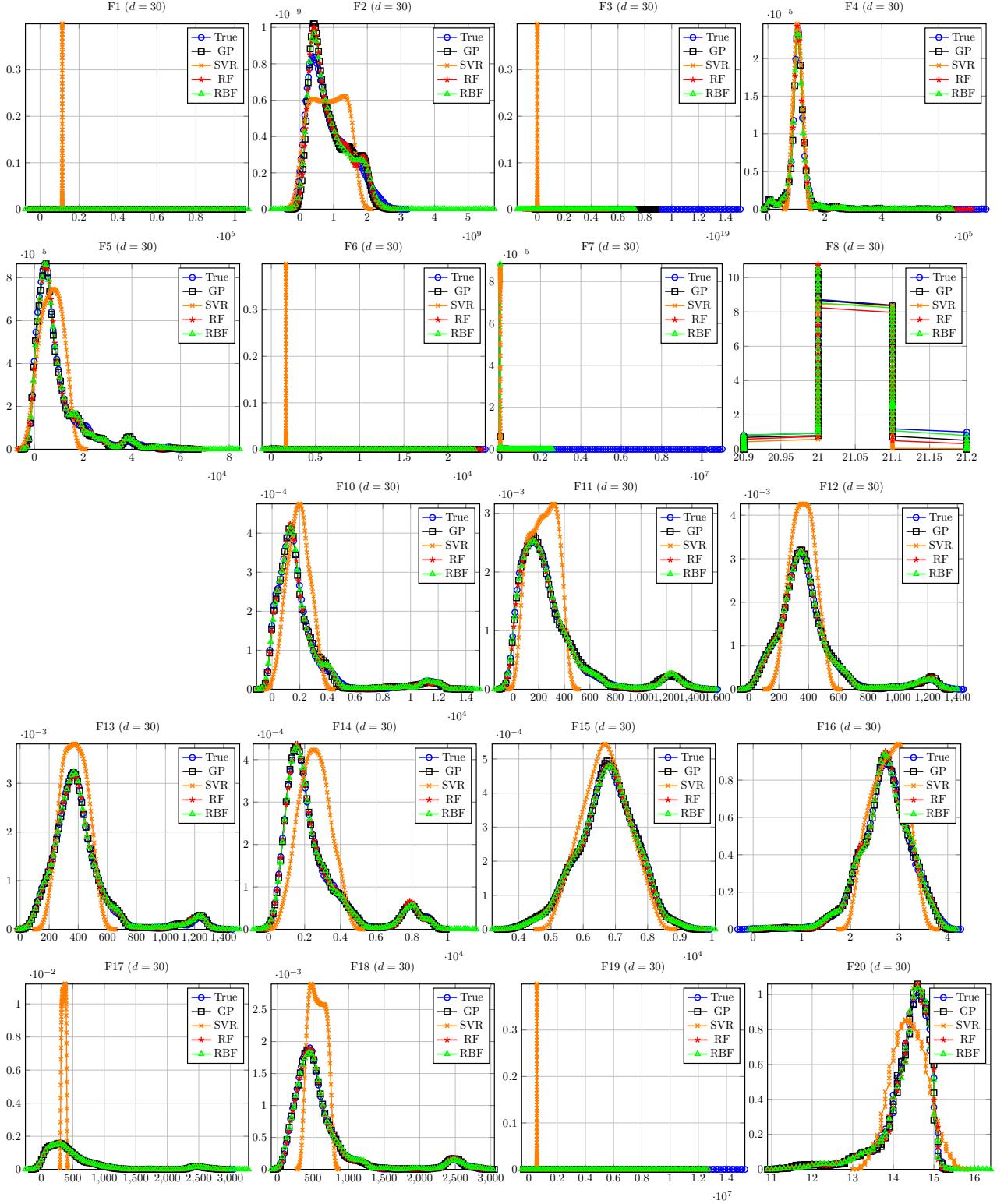


Figure 81: Estimated probability density distribution of the empirical performance predicted by four different regression algorithms and the ground truth ( $d = 30$ ).

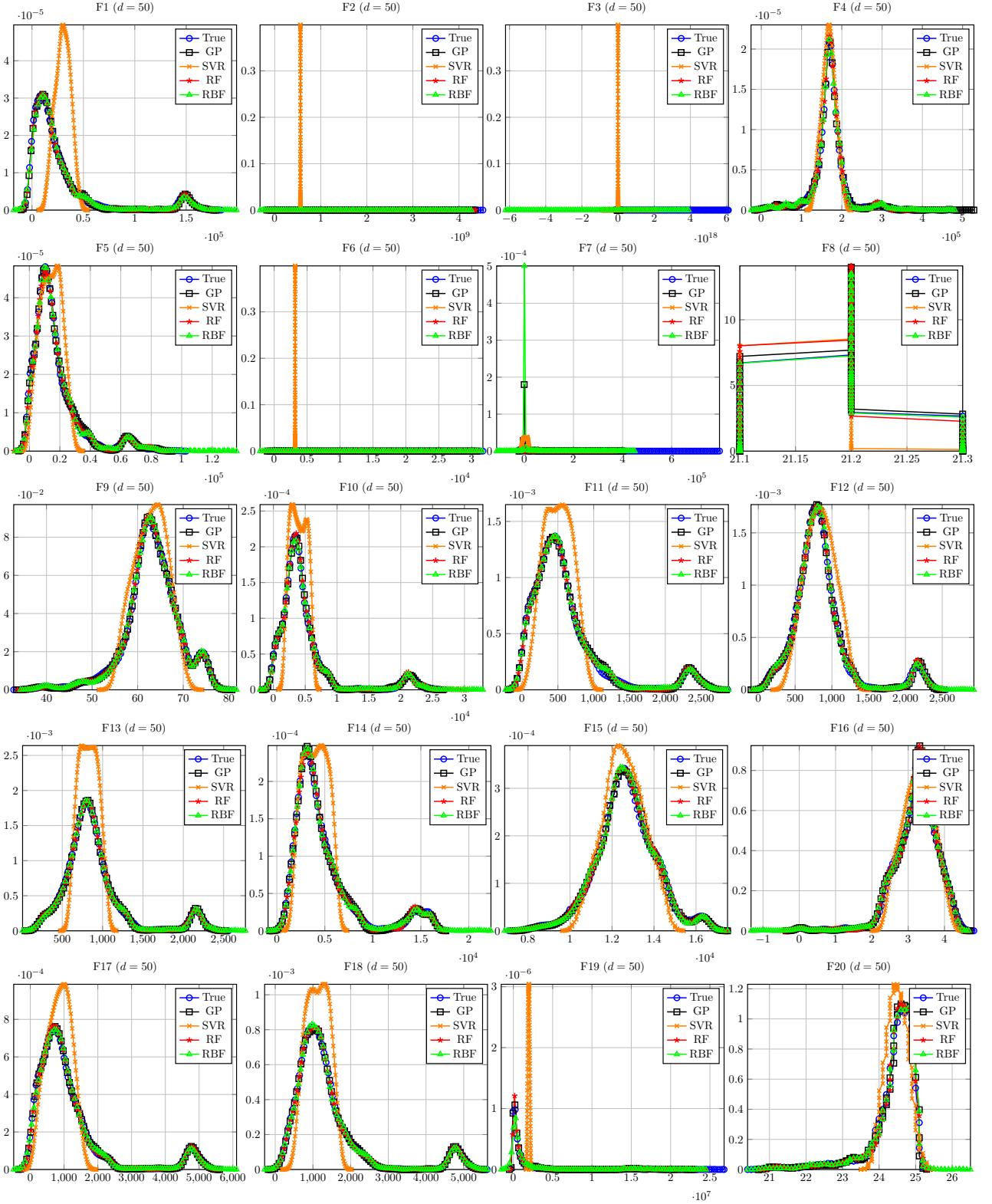


Figure 82: Estimated probability density distribution of the empirical performance predicted by four different regression algorithms and the ground truth ( $d = 50$ ).