**南京信息工程大学本科生毕业论文（设计）任务书**

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| 学 院 | 数学与统计学院 | | | | 专 业 | | 信息与计算科学（嵌入式） | |
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| 论文题目 | **基于ICFWD对LFM信号的输出信噪比期望不等式模型** | | | | | | | |
| 论文性质 | √ 毕业论文 □毕业设计 | | | | | | | |
| 选题类型 | √ 理论研究型 □实验研究型 □软件设计型 □工程设计型 □艺术设计型 □其他 | | | | | | | |
| 选题来源 | √ 结合教师科研 □结合教育教学 □结合实验室建设 □结合生产实际 □自拟 | | | | | | | |
| 工作量 | □大 √ 中 □小 | | 难易度 | | | √较难 □ 中等 □简单 | | |
| 论文（设计）目标 | 该论文旨在建立一种基于瞬时互相关函数型Wigner分布（ICFWD）的线性调频雷达信号高效检测方法。探索含噪信号构建输出信噪比改善数学理论，突破线性正则域时空超分辨率估计领域中的关键核心技术，有力推动非平稳信号检测精度与速度。 | | | | | | | |
| 论文（设计）内容 | 1. 建立线性正则域高维信息表示模型，对线性正则域不确定性进行下界估计。  2. 描述时频空分辨率不确定关系，建立输出信噪比不等式，计算出对空间分辨率估计精度提高的结果。  3. 利用含噪线性调频信号，进行模拟仿真分析，研究检测性能提升的内在机制。 | | | | | | | |
| 指定参考文献 | [1] Ozaktas H M, Zalevsky Z, Kutay M A. The Fractional Fourier Transform with Applications in Optics and Signal Processing[M]. New York: Wiley, 2001.  [2] Sharma K K, Joshi S D. Uncertainty principle for real signals in the linear canonical transform domains[J]. IEEE Transactions on Signal Processing, 2008, 56(7): 2677–2683.  [3] Zhao J, Tao R, Li Y, Wang Y. Uncertainty principles for linear canonical transform[J]. IEEE Transactions on Signal Processing, 2009, 57(7): 2856–2858.  [4] Xu G, Wang X, Xu X. On uncertainty principle for the linear canonical transform of complex signals[J]. IEEE Transactions on Signal Processing, 2010, 58(9): 4916–4918.  [5] Zhao J, Tao R, Wang Y. On signal moments and uncertainty relations associated with linear canonical transform[J]. Signal Processing, 2010, 90(9): 2686–2689.  [6] Dang P, Deng G, Qian T. A tighter uncertainty principle for linear canonical transform in terms of phase derivative[J]. IEEE Transactions on Signal Processing, 2013, 61(21): 5153–5164.  [7] Dang P, Deng G, Qian T. A sharper uncertainty principle[J]. Journal of Functional Analysis, 2013, 265(10): 2239–2266.  [8] Zhang Z. Tighter uncertainty principles for linear canonical transform in terms of matrix decomposition[J]. Digital Signal Processing, 2017, 69(10): 70–85.  [9] Zhang Z. Uncertainty principle for linear canonical transform using matrix decomposition of absolute spread matrix[J]. Digital Signal Processing, 2019, 89(6): 145–154.  [10] Xu G, Wang X, Xu X. Three uncertainty relations for real signals associated with linear canonical transform[J]. IET Signal Processing, 2009, 3(1): 85–92.  [11] Xu G, Wang X, Xu X. Uncertainty inequalities for linear canonical transform[J]. IET Signal Processing, 2009, 3(5): 392–402.  [12] Kou K, Xu R, Zhang Y. Paley-Wiener theorems and uncertainty principles for the windowed linear canonical transform[J]. Mathematical Methods in the Applied Sciences, 2012, 35(17): 2122–2132.  [13] Yang Y, Kou K. Uncertainty principles for hyper complex signals in the linear canonical transform domains[J]. Signal Processing, 2014, 95(2): 67–75.  [14] Feng Q, Li B, Rassias J M. Weighted Heisenberg-Pauli-Weyl uncertainty principles for the linear canonical transform[J]. Signal Processing, 2019, 165(12): 209–221.  [15] Ding J, Pei S. Heisenberg’s uncertainty principles for the 2-D nonseparable linear canonical transforms[J]. Signal Processing, 2013, 93(5): 1027–1043.  [16] Li Y, Li B, Sun H. Uncertainty principles for Wigner-Ville distribution associated with the linear canonical transforms[J]. Abstract and Applied Analysis, 2014, 2014(7): 470459.  [17] Zhang Z. Uncertainty principle for real functions in free metaplectic transformation domains[J]. Journal of Fourier Analysis and Applications, 2019, 25(6): 2899–2922. | | | | | | | |
| 备注 |  | | | | | | | |